DETERMINATION REPORT
SKHIDENERGO LTD.

DETERMINATION OF THE
RECONSTRUCTION OF UNITS 1, 2, 3 AND 4
AT ZUYEVSKA THERMAL POWER PLANT

REPORT NO. UKRAINE/0038/2009

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BUREAU VERITAS CERTIFICATION

Report № Ukraine/0038/2009

DETERMINATION REPORT

Date of first issue:	Organizational unit
31/08/2010	Bureau Veritas Certification Holding SAS
Client: Skhidenergo ltd.	Client ref.: Yuriy Magera

Summary:
Bureau Veritas Certification has made the determination of the "Reconstruction of Units 1, 2, 3 and 4 at Zuyevska Thermal Power Plant" project of Skhidenergo Ltd. located in Zugres on the basis of UNFCCC criteria for the JI, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 6 of the Kyoto Protocol, the JI rules and modalities and the subsequent decisions by the JI Executive Board, as well as the host country criteria.

The determination scope is defined as an independent and objective review of the project design document, the project's baseline study, monitoring plan and other relevant documents, and consisted of the following three phases: i) desk review of the project design and the baseline and monitoring plan; ii) follow-up interviews with project stakeholders; iii) resolution of outstanding issues and the issuance of the final determination report and opinion. The overall determination, from Contract Review to Determination Report & Opinion, was conducted using Bureau Veritas Certification internal procedures.

The first output of the determination process is a list of Clarification and Corrective Actions Requests (CLs and CARs), presented in Appendix A. Taking into account this output, the project proponent revised its project design document.

In summary, it is Bureau Veritas Certification's opinion that the project correctly applies JI specific approach and meets the relevant UNFCCC requirements for the JI and the relevant host country criteria.

Report No.:	Subject Group:
UKRAINE/0038/2009	JI

Report title:
Reconstruction of Units 1, 2, 3 and 4 at Zuyevska Thermal Power Plant.

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Abbreviations

AIE	Accredited Independent Entity
CAR	Corrective Action Request
CL	Clarification Request
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CH_4	Methane
EIA	Environmental Impact Assessment
ERU	Emission Reduction Unit
FCCC	Framework Convention On Climate Changes
GHG	Green House Gas(es)
JI	Joint Implementation
JIP	Joint Implementation Projects
JISC	Joint Implementation Supervisory Committee
I	Interview
IETA	International Emissions Trading Association
MoV	Means of Verification
PDD	Project Design Document
PP	Project Participant
SD	Supporting Document
UNFCCC	United Nations Framework Convention for Climate Change
UES	United Energy System

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1 INTRODUCTION

Skhidenergo Ltd. has commissioned Bureau Veritas Certification to determinate the JI project Improvement of the "Reconstruction of Units1,2,3 and 4 at Zuyevska Thermal Power Plant.".

This report summarizes the findings of the determination of the project, performed on the basis of UNFCCC criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting, under Track 2.

1.1 Objective

The determination serves as project design verification and is a requirement of all projects. The determination is an independent third party assessment of the project design. In particular, the project's baseline, the monitoring plan, and the project's compliance with relevant UNFCCC and host country criteria are determined in order to confirm that the project design, as documented, is sound and reasonable, and meet the stated requirements and identified criteria. Determination is a requirement for all JI projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of emission reduction units (ERUs).

UNFCCC criteria refer to Article 6 of the Kyoto Protocol, the JI rules and modalities and the subsequent decisions by the JI Supervisory Committee, as well as the host country criteria.

1.2 Scope

The determination scope is defined as an independent and objective review of the project design document, the project's baseline study and monitoring plan and other relevant documents. The information in these documents is reviewed against the Kyoto Protocol requirements, UNFCCC rules and associated interpretations.

The determination is not meant to provide any consulting towards the Client. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the project design.

1.3 GHG Project Description

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Outlook of power sector in Ukraine

The power generation industry is of key importance to the development of the Ukrainian economy, as both industrial and municipal/domestic sectors depend on electric power for their operation. The energy sector of Ukraine is the twelfth largest in the world and is the one that experienced deep stagnation after the breakup of the USSR. The rise in electricity consumption and generation started in 1999-2000 and has continued ever since, however, a slight decrease is evident from the end of 2008. The total installed generation capacity currently reaches about 52 GW.

In 2007 thermal power plants (TPP) were producing about 40% of all electricity generated, whereas their share in available installed capacity reaches ca. 52%. This proportion has remained fairly stable from 2005 to 2007, this is much lower than in the late eighties (1985-1990), where the share of TPPs in the energy balance was far higher, 65-70%.

Power Plants	Power generation	
	Billion kWh	%
Nuclear	92.5	47.4
Thermal	73.5	37.7
CHP	10.7	5.5
Hydro	10.1	5.2
Wind	0.01	0.003
Others	8.2	4.2
Total	**195.1**	**100.0**

Table 1: Structure of electricity production in for the year 2007.

The base load is covered mainly by nuclear power plants, while hydro and TPPs (due to lack of reserve capacities) have to play a role of balancing capacities, providing power during peak consumption and semi-peak hours of the day. This role has not changed in the last decade and is expected to remain for the foreseeable future. The typical power demand profile during winter and summer time is shown in figure 2 below, which also indicates the size of gap between the night and peak hours which are covered by fossil and hydro units. Current forecasts indicate that by 2030 TPPs will generate approximately 150 – 210 GWh, which is two to three times the 2007 generation.

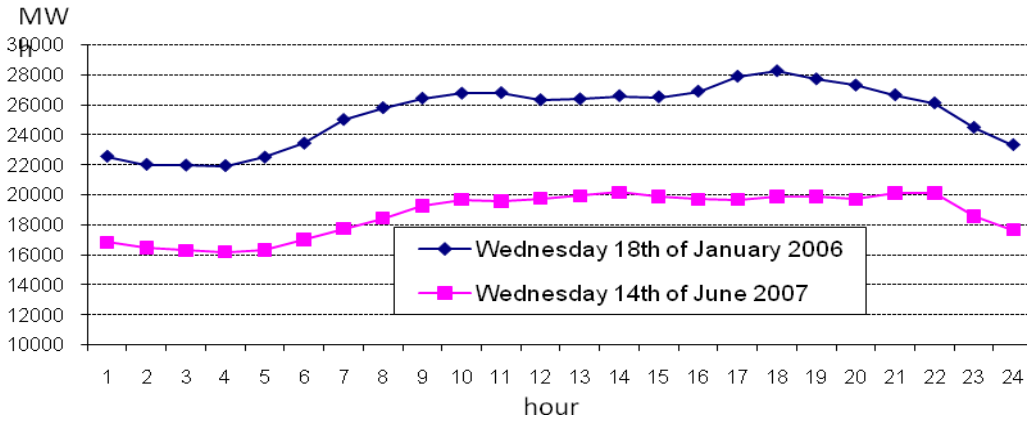

Figure 1: Load curve typical summer/winter day.

There are four stock Fossil generation companies, who own a total of eleven power stations. The majority of stock, over 70%, is government owned, and the main government organization, to which all the others are subordinated, is “The Energy Power Company of Ukraine”. Three others PPs belong to the private company DTEK (formerly “The Donbass Fuel and Power Company”). There are also eight hydraulic power plants that are united by the State Joint-Stock Company “Ukrainian Hydroenergo” and four nuclear plants that belong to the National Nuclear Power-Generating Company “EnergoAtom”.

The TPP fleet consists of 97 conventional steam turbine based plants with units varying between 150 to 800 MW installed capacity, predominantly using domestic coal as fuel, with a few using gas or heavy fuel oil. The TPPs are owned by five power generating companies. Four of them are state owned under the state holding NJSC “Energy company of Ukraine”, which has a total of 71 coal-fired and eight gas fired units, listed below:

- OJSC “Zakhidenergo” with total installed capacity 4700 MW. It consists of three TPPs – Burshtynska, Dobrotvirska and Ladyzhinska, which are mainly located in western region of Ukraine. All are coal fired;
- OJSC “Centrenergo” with total installed capacity 7575 MW. It operates three TPPs: Trypilska TPP (near Kiev), Zmiivska TPP (near Kharkiv) and Vuglegirska TPP (in Donbas region);
- OJSC “Dniproenergo” with total installed capacity 8185 MW, which combines three TPPs: Prydniprovska TPP, Zaporizhska TPP and Kryvorizhska TPP, which are located in the centre and southwest of Ukraine;
- OJSC “Donbasenergo” with total installed capacity 2655 MW. This power generating company is the smallest one. It operates two TPPs: Slovianska TPP and Starobeshivska TPP - both located in Donbas region;

Three coal fired TPPs are owned by the private capital company “Skhidenergo” Ltd, which is part of DTEK holding:

- Zuyevska TPP;
- Kurakhivska TPP;
- Luhanska TPP.

DTEK runs 17 coal fired units.

The existing TPP fleet was mainly built between 1960s and the start of the 80s, with a few newer plants commissioned at the end of 1980s. Over 90% of the TPPs have been operating for more than 100,000 hours and 63% of them have exceeded 170,000 running hours. This has resulted in a degradation of the plants efficiency and, therefore, an increase in fuel consumption.

With the exception of two projects in fossil power generation mentioned below no major modernisation/rehabilitation projects to increase plant efficiency can be found over the past 10 to 15 years in the fossil TPPs fleet.

The first project was the rehabilitation of unit #8 of Zmiivska TPP, co-financed by the World Bank (WB) in 1998. The second project was the reconstruction of unit #4 of Starobeshevska TPP, financed by the European Bank for Reconstruction and Development (EBRD) during 2000 to 2004). It is worth mentioning can be the modernisation of part of units of state owned Burshtyn TPP, but the project was mainly aimed at provision of its operation within the UCTE interconnected system.

Description of proposed project

The proposed project is aimed at increasing the fuel efficiency, reliability, and availability of all four coal fired units at Zuyevska TPP, which belong to DTEK holding company. The TPP has four identical conventional condensing steam turbine units of 300 MW each. They were commissioned in 1982, 1986, and 1988, and as such, the TPP can be considered as one of the newest coal fired TPPs connected to the grid.

Implementation of the proposed project activity allows producing power with higher efficiency, thus reducing the amount of combustion of fossil fuels (mainly coal) significantly below the level of what would happen in the absence of the proposed project. It directly results in reduction of GHG emission as well as emission of pollutants (dust, SO_x)

The proposed project is intended to modernise all four units at the TPP in order to:

- Improve energy efficiency and reduce auxiliary equipment consumption
- Improve reliability and availability
- Improve part-load efficiency
- Introduce modern control systems
- Reduce the dust emission
- Reduce SO_x emission

The design solutions proposed for project implementation reflect good engineering practices provided by major local and international equipment manufacturers.

The solutions allow increasing the efficiency of existing power plant equipment to a level higher than foreseen by the original design. They represent state of the art modernisation technology which could be applied over the existing power plant equipment.

The project milestones are shown in table 2 below:

Unit #	Start up after reconstruction
1	December 2009, under reconstruction

2	December 2008, in operation
3	December 2011
4	December 2010

Table 2. Planned sequence and schedule of reconstruction of the units

The scope of reconstruction of each of the units is generally identical, and differs only in details. Flue gas desulfurization (FGD) plant is also included, and it is planned to be common for units 1, 3, and 4, with Unit #2 having an individual FDG plant.

The unit reconstruction consists of the following packages of individual measures:

1. Modernisation of steam turbine generator (STG), including:
    a. Retrofit of low pressure cylinder of STG, replacement and modernisation of STG auxiliaries
    b. Rehabilitation of high and middle pressure STG cylinders
    c. Rehabilitation of regeneration equipment and vacuum system
    d. Retrofit of alternator cooling system
2. Rehabilitation of the boiler
3. Modernisation of the unit control system
4. Rehabilitation of the unit step-up transformer
5. Modernisation of switch room equipment, partial replacement of circuit breakers
6. Improvement of ESP (electrostatic precipitators) operation

Expected result

It is expected that under normal operating conditions the specific fuel consumption of the plant will be decreased from current value of approximately 10.523 to 10.04 GJ/MWh (from 359.059 to 342.5 g.c.e/kWh). This will allow operation of TPP units with high efficiency for the long period without a need to replace or substitute the equipment by more efficient one within the project period.

Since the main process of electricity production stays the same, it is not expected that operation and maintenance of equipment will represent difficulties for plant personnel. Some new equipment, like control and instrumentation, however would require initial training of staff. This will be provided by the respective suppliers.

Date start and commissioning

The first stage in project implementation was achieved on the 30 December 2008 with the first start of the reconstructed unit #2. Within the first commitment period of 2008-2012 the following schedule is planned:

Start of Unit #1 after reconstruction	December 2009
Start of Unit #4 after reconstruction	December 2010
Start of Unit #3 after reconstruction	December 2011

Average time for reconstruction of one unit up to its commissioning is about nine months (actual time for unit #2 and expected for units 1, 3 and 4). It includes design,

equipment supply, installation and commissioning. Therefore, the latest dates for commissioning are shown above.

1.4 Determination Group

The determination team consists of the following personnel:

Ivan Sokolov
Bureau Veritas Certification Team Leader, Climate Change Lead Verifier

Oleg Skoblyk -
Bureau Veritas Certification Team member, Climate Change Verifier

Kateryna Zinevych -
Bureau Veritas Certification Team member, Climate Change Verifier

Denis Pishchalov
Bureau Veritas Certification Team member, Financial Specialist

Report was reviewed by:

Leonid Yaskin
Bureau Veritas Certification Internal Technical Reviewer

2. METHODOLOGY

The overall determination, from Contract Review to Determination Report & Opinion, was conducted using Bureau Veritas Certification internal procedures.

In order to ensure transparency, the determination protocol was customized for the project, according to the Determination and Verification Manual (IETA/PCF). The protocol shows, in a transparent manner, criteria (requirements), means of verification and the results from validating the identified criteria. The determination protocol serves the following purposes:

It organizes, details and clarifies the requirements JI project is expected to meet;

It ensures a transparent determination process where the determinator will document how a particular requirement has been validated and the result of the determination.

The determination protocol consists of five tables. The different columns in these tables are described in Figure 2.

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The completed determination protocol is enclosed in Appendix A to this report.

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Determination Protocol Table 1: Mandatory Requirements			
Requirement	**Reference**	**Conclusion**	**Cross reference**
The requirements the project must meet.	Gives reference to the legislation or agreement where the requirement is found.	This is either acceptable based on evidence provided (**OK**), a **Corrective Action Request (CAR)** or a **Clarification Request (CL)** of risk or non-compliance with stated requirements. The CAR's and CL's are numbered and presented to the client in the Determination Report.	Used to refer to the relevant protocol questions in Tables 2, 3 and 4 to show how the specific requirement is determined. This is to ensure a transparent determination process.

Determination Protocol Table 2: Requirements checklist				
Checklist Question	**Reference**	**Means of verification (MoV)**	**Comment**	**Draft and/or Final Conclusion**
The various requirements in Table 1 are linked to checklist questions the project should meet. The checklist is organized in several sections. Each section is then further sub-divided. The lowest level constitutes a checklist question.	Gives reference to documents where the answer to the checklist question or section is found.	Explains how conformance with the checklist question is investigated. Examples of means of verification are document review (DR) or interview (I). N/A means not applicable.	The section is used to elaborate and discuss the checklist question and/or the conformance to the question. It is further used to explain the conclusions reached.	This is either acceptable based on evidence provided (**OK**), or a **Corrective Action Request (CAR)** due to non-compliance with the checklist question. (See below). **Clarification Request (CL)** is used when the determination team has identified a need for further clarification.
Determination Protocol Table 3: Baseline and Monitoring Methodologies				
Checklist Question	**Reference**	**Means of verification (MoV)**	**Comment**	**Draft and/or Final Conclusion**
The various requirements of baseline and monitoring methodologies should be met. The checklist is organized in several sections. Each section is then further sub-divided. The lowest level constitutes a checklist question.	Gives reference to documents where the answer to the checklist question or section is found.	Explains how conformance with the checklist question is investigated. Examples of means of verification are document review (DR) or interview (I). N/A means not applicable.	The section is used to elaborate and discuss the checklist question and/or the conformance to the question. It is further used to explain the conclusions reached.	This is either acceptable based on evidence provided (**OK**), or a **Corrective Action Request (CAR)** due to non-compliance with the checklist question. (See below). **Clarification Request (CL)** is used when the determination team has identified a need for further clarification.

Determination Protocol Table 4: Legal requirements				
Checklist Question	**Reference**	**Means of verification (MoV)**	**Comment**	**Draft and/or Final Conclusion**
The national legal requirements the project must meet.	Gives reference to documents where the answer to the checklist question or section is found.	Explains how conformance with the checklist question is investigated. Examples of means of verification are document review (DR) or interview (I). N/A means not applicable.	The section is used to elaborate and discuss the checklist question and/or the conformance to the question. It is further used to explain the conclusions reached.	This is either acceptable based on evidence provided (**OK**), or a **Corrective Action Request (CAR)** due to non-compliance with the checklist question. (See below). **Clarification Request (CL)** is used when the determination team has identified a need for further clarification.

Determination Protocol Table 5: Resolution of Corrective Action and Clarification Requests			
Report clarifications and corrective action requests	**Ref. to checklist question in tables 1/2/3/4**	**Summary of project owner response**	**Determination conclusion**
If the conclusions from the Determination are either a Corrective Action Request or a Clarification Request, these should be listed in this section.	Reference to the checklist question number in Tables 2, 3 and 4 where the Corrective Action Request or Clarification Request is explained.	The responses given by the Client or other project participants during the communications with the determination team should be summarized in this section.	This section should summarize the determination team's responses and final conclusions. The conclusions should also be included in Tables 2, 3 and 4, under "Final Conclusion".

Figure 2 Determination protocol tables

2.1 Review of Documents

The Project Design Document (PDD version 1.1) submitted by Skhidenergo Ltd. 31/08/2009 together with supporting documentation in terms of calculation of GHG emission.

PDD Version 2.1 was made publicly available for comments on http://ji.unfccc.int/JI_Projects/DB/YB19L9FFLY7AD3CTGH07TW7V16KYEF/PublicPDD/2NO4ILVGAVNPWXG2U4MPDRG7JKAY3H/view.html site from 28 October 2009 to 26 November 2009.

PDD Version 1.1 and supporting documentation as well as additional background documents related to the project design, baseline, and monitoring plan, such as the Kyoto Protocol, host Country laws and regulations, JI guidelines, JISC Guidance on criteria for baseline setting and monitoring, and Guidelines for users of the JI PDD Form were reviewed.

The first deliverable of the document review was the Draft Determination Report with 16 CAR's and 36 CL's.

To address Bureau Veritas Certification corrective action and clarification requests, Skhidenergo Ltd. revised the PDD and as a response issued PDD version 2.0 dated 3/10/2009, PDD version 2.1 dated 23/10/2009, PDD version 2.3.1 dated 29/12/2009, version 2.4 dated 09/02/2010, version 2.5 dated 10/02/2010, version 2.6 dated 02/03/2010, version 2.7 dated 30/08/2010 and finally resubmitted the PDD version 2.8 dated 15/12/2010.

The determination findings presented in this report relate to the project as described in the PDD, revision 1.1, revision 2.7 and revision 2.8.

2.2 Follow-Up Interviews

On 01/10/2009 Bureau Veritas Certification performed interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review.

Representatives of Skhidenergo Ltd. and Global Carbon were interviewed (see References). The main topics of the interviews are summarized in Table 3.

Table 3 Interview topics

Interviewed organization	Interviews Topics
Skhidenergo ltd.	➢ Organizational structure. ➢ Responsibilities and authorities. ➢ Training of personnel. ➢ Quality management procedures and technology. ➢ Rehabilitation /Implementation of equipment (records). ➢ Metering equipment control. ➢ Metering record keeping system, database.
Global Carbon	➢ Baseline methodology. ➢ Monitoring plan. ➢ Monitoring report. ➢ Deviations from PDD.

2.3 Resolution of Clarification and Corrective Action Requests

The objective of this phase of the determination is to raise the requests for corrective actions and clarification and any other outstanding issues that needed to be clarified for Bureau Veritas Certification positive conclusion on the project design.

To guarantee the transparency of the determination process, the concerns raised are documented in more detail in the determination protocol in Appendix A.

3 DETERMINATION FINDINGS

In the following sections, the findings of the determination are stated. The determination findings for each determination subject are presented as follows:

1) The findings from the desk review of the original project design documents and the findings from interviews during the follow up visit are summarized. A more detailed record of these findings can be found in the Determination Protocol in Appendix A.

2) Where Bureau Veritas Certification had identified issues that needed clarification or that represented a risk to the fulfillment of the project objectives, a Clarification or Corrective Action Request, respectively, have been issued. The Clarification and Corrective Action Requests are stated, where applicable, in the following sections and are further documented in the Determination Protocol in Appendix A. The determination of the Project resulted in 16 Corrective Action Requests and 36 Clarification Requests.

3) The conclusions for determination subject are presented.

3.1 Project Design

Bureau Veritas Certification recognizes that Skhidenergo Ltd. Project is helping country fulfill its goals of promoting sustainable development. The project is expected to be in line with host-country specific JI requirements.

The Project Scenario is considered additional in comparison to the baseline scenario, and therefore eligible to receive Emissions Reductions Units (ERUs) under the JI, based on an analysis, presented by the PDD, of investment, technological and other barriers, and prevailing practice.

The project design is sound and the geographical and temporal (13 years) boundaries of the project are clearly defined.

Outstanding issues related to project design are given in the Table 5 below (see CAR1, CAR8, CAR9, CL2, CL3, CL4, CL5, CL6, CL7, CL21).

3.2 Baseline and Additionality

The “Reconstruction of Units 1, 2, 3 and 4 at Zuyevska Thermal Power Plant.” project uses the baseline and monitoring approach developed according the Guidance on Criteria for Baseline Setting and Monitoring and meets the relevant UNFCCC requirements for the JI and the relevant host country criteria.

A baseline for a JI project has to be set in accordance with Appendix B of the Annex to decision 9/CMP.1 (JI guidelines), and with the “Guidance on criteria for baseline setting and monitoring, version 02” developed by the Joint Implementation Supervisory Committee (JISC) (hereinafter referred to as “Guidance”). A JI specific approach regarding baseline setting and monitoring has been developed in accordance with Appendix B of the JI Guidelines and with the JISC Guidance. This specific approach will use some elements of CDM methodology AM0061.

The baseline is the scenario that reasonably represents the anthropogenic emissions by sources of greenhouse gases that would occur in the absence of the proposed project.

Plausible future scenarios are identified and listed on the basis of conservative assumptions (paragraph 24 of the Guidance). The proposed project, not developed as a JI project, has been included as one of the alternatives. These alternatives are assessed as credible or plausible, and the most plausible is identified as the baseline. The consistency between the baseline scenario determination and additionality determination has been checked.

The proposed approach is being applied through the following three steps:

1. Identification of a baseline in accordance with paragraphs 21-29 of the Guidance;
2. Additionality demonstration in accordance with the most recent version (version 05.2) of the "Tool for the demonstration and assessment of additionality";
3. Calculation of emissions of the baseline scenario.

The proposed approach allows reducing the uncertainties by using of historically recorded data as well as parameters measured in the project scenario for the baseline. The usage of values measured with high accuracy (electricity and fuel) and IPCC default factors is foreseen.

The conservativeness for the baseline is safeguarded by not taking into account the degradation of efficiency of the plant over time.

Uncertainty is reduced by taking average historical plant operation records for the extended period of seven years preceding the project start.

The possible alternative baseline scenarios are the following:

(a) Reconstruction/modernization of turbine (steam turbo generator) only without reconstructing the boiler island of the power plant, and without reconstructing the unit auxiliary systems;
(b) Reconstruction/modernization of boiler island only, without reconstruction of STG and unit auxiliaries;
(c) Reconstruction/modernization of unit auxiliary equipment only, without reconstruction of STG and boiler;
(d) Reconstruction/modernization of both, boiler and turbine equipment and modernization of unit auxiliary equipment (represents the proposed project not undertaken as JI);
(e) Construction of new generating capacity;
(f) Continuation of operation of existing power plant;

The baseline options considered do not include those options that:

- do not comply with legal and regulatory requirements; or
- depend on key resources such as fuels, materials or technology that are not available at the project site.

The most economically attractive alternative among the alternatives mentioned above has been selected as the baseline scenario, since such alternative is not expected to face any prohibitive barriers that could have prevented it from being taken up as the project activity. Alternative (f) is the baseline scenario.

The proposed approach to additionality demonstration and assessment applies the investment and sensitivity analyses of the project investment activity. The calculations on the spreadsheet annexes to PDD showed that the project is not economically attractive without ERU sale. This implies that the project cannot be the most plausible baseline scenario that can otherwise occur.

The verifiers observe that the additionality is clearly demonstrated in section B.2 of PDD version 2.8 used latest version of the CDM Executive Board approved "Tool for the demonstration and assessment of additionality", Version 05.2. This observation does not challenge the project approach.

Outstanding questions connected with baseline and additionality are given in Table 5 below (See CAR2, CAR3, CAR4, CAR5, CAR6, CL8, CL9, CL10, CL11, CL12, CL13, CL14, CL15, CL16, CL17, CL18, CL19, CL20, CL34).

3.3 Monitoring plan

The Project uses the baseline and monitoring approach developed according to the Guidance on *Criteria for Baseline Setting and Monitoring* and meets the relevant UNFCCC requirements for the JI and the relevant host country criteria. Refer to section 3.2 above.

Outstanding questions connected with monitoring plan are given in Table 5 below (See CAR9, CAR10, CAR11, CL22, CL23, CL24, CL25, CL26, CL27, CL28, CL29, CL30).

3.4 Calculation of GHG Emissions

The Project emission is being calculated as follows:

$$PE_y = PE_{Fuel,y}$$

Where:

PE_y Project emission in year y (tCO_2)

$PE_{Fuel,y}$ Project emission due to combustion of fossil fuels in the boilers of TPP in year y (tCO_2)

$$PE_{Fuel,y} = \sum_i \left(FC_{i,y} \times EF_{CO2,i} \times NCV_{i,y} \right)$$

Where:

$FC_{i,y}$ is the fuel of type *i* consumed during year y (tonnes or thousand Nm^3)

$EF_{CO2,i}$ fuel of type *i* Emission Factor (tCO_2/GJ)

$NCV_{i,y}$ is the net calorific value of fuel of type i in year y (GJ/ton or per thousand Nm.

The Project emission is being calculated as follows:

$$BE_y = BE_{Fuel,y}$$

Where:

BE_y is the baseline emissions for the year y (tCO_2)
$BE_{Fuel,\ y}$ is the baseline CO_2 emissions due to combustion of fossil fuels in the boilers of TPP (tCO_2)

$$BE_{Fuel,y} = SFC_{Bsl} \times \frac{\sum_i \left(FC_{i,y} \times NCV_{i,y} \times EF_{CO_2 i,y}\right)}{\sum_i \left(FC_{i,y} \times NCV_{i,y}\right)} \times EL_y$$

Where:
SFC_{BSL} is the baseline specific fuel consumption for supply of power to the grid (station heat rate) (GJ/MWh)
$FC_{i,\ y}$ is the fuel of type i (coal, natural gas and heavy fuel oil (mazut)) consumption during the year y (tons)
$EF_{CO2,I,y}$ is the carbon emission factor of fuel of type i during the year y (tCO_2/GJ)
$NCV_{i,\ y}$ is the net (lower) calorific value of fuel of type i during the year y (GJ/ton)
EL_y is the annual amount of electricity supplied by TPP to the grid in year y (MWh)

$$SFC_{Bsl} = \sum_y SFC_y \times \frac{1}{7},$$

Where:
SFC_y is the specific fuel consumption of the TPP in year y (GJ/MWh)
SFC_{Bsl} is the baseline fuel consumption of the TPP (GJ/MWh)
EL_y is the power supplied by TPP to the grid in year y (MWh)
y is the year from 2002 to 2008

Leakage is not expected, as due to the Project implementation the fuel consumption is lowered, so the Leakages due to the fugitive CH_4 emission are also lowered. Moreover, this value is vanishingly small and we use the conservative assumption, that the leakage is left the same as in the Baseline Scenario.

The emission reductions achieved during the project period are calculated as a difference between annual baseline emission and annual project emission. It is shown by the formula:

$$ER_y = BE_y - PE_y$$

Where:
ER_y is emission reduction of the JI project in year y (tCO_2e)
BE_y is the baseline emissions in year y (tCO_2e)
PE_y is the project emissions in year y (tCO_2e)

The final calculations are observed as accurate. The results are summarised in Section E of the PDD version 2.8.

Total expected emission reductions of the Project:

For the period 2008-2012 – 807 803 t CO2 eq., average annual – 201 951 t CO2 eq.

For the period 2013-2020 – 2 403 641 t CO2 eq., average annual – 300 455 t CO2 eq.

Outstanding questions connected with GHG calculations are given in Table 5 below (See CAR12, CAR13, CAR14, CAR15, CL31, CL32).

3.5 Environmental impacts

Power production has an impact on the local environment. In Ukraine emission levels in power sector are regulated by operating licenses issued by the regional offices of the Ministry for Environmental Protection on an individual basis for each enterprise that has a deemed significant impact on the environment. The current levels of emissions of the main pollutants (dust, sulphur oxides and nitrogen oxides), are in compliance with the requirements of the plant's operational license.
The assessment of environmental impact (AEI) was performed for two units: #2 and #1 which are the first units under the project schedule. The conclusions drawn from the assessment are positive and confirm that the project is in line with Ukrainian environmental legislation in force. Approximately a year in advance of start of reconstruction of units 3 and 4 the assessment of environmental impacts will be performed for these units as well. See section F.2 for data on AEI performed.
According to the information from the design documentation, including environmental impact assessment, there is no transboundary impact to be expected, as all pollution will occur within the sanitary zone of the Zuyevska TPP.

Climate and microclimate
The planned project activity will have no negative impact on the climate and microclimate.

Air pollution
There are 52 identified sources of the air pollution available on-site.

Dust
Dust, emitted from electricity production processes, is non-toxic, however, is considered a nuisance. The main sources of dust from the electricity production at the coal fired TPP are the coal mill, including fuel transportation system, and coal-fired boilers. Dust emissions from Zuyevska TPP are monitored on a regular basis in compliance with the norms and regulations in force.
ESPs are used to treat flue gasses from fly ash. The ESPs have an efficiency ratio of 99.2%. Coal transportation system exhausts through the ventilation system are treated with cyclones with efficiency 94.8%.

Nitrogen and sulphur oxides
NOx is formed due to the oxidation reaction of the atmospheric nitrogen at high temperatures in the boiler during coal dust combustion process and reaching about 1200 mg/m^3 (at 6% of O_2 content). It is expected that after project commissioning the

emissions will not exceed the limits allowed by the requirements of the Ukrainian legislation.

SOx emissions in power production originate mainly from sulphur content in the combusted coal, and are about 3000 mg/m^3 (at 6% of O_2 content). The sulphur content in the fuel used at Zuyevska TPP is significant (1.1-1.9%) in compliance with local limits and should not be increase after the implementation of the project. The Units will be equipped with FGD plants over the next 5 years.

Water contamination
Zuyevska TPP has a return water supply system. The source for industrial water is the river Krynka, and Zuyevska TPP has a permit for water intake. A special filter dam is used to prevent fish from becoming trapped in the intake channels.

Waste water treatment is undertaken using mechanical, chemical, and biological treatment.

Bottom ash is transported to the slurry pond by water (wet ash removal system). Therefore the slurry pond is the main source for ground water contamination at Zuyevska TPP. However, despite this, the main ground water contamination level is determined by other pollution sources in the region, and the project implementation will result in a decrease of the harmful emissions, resulting in a positive impact on the environment.

Waste handling
Waste handling is in compliance with legislative norms. All waste is collected in a proper manner, including the accounting of the waste produced. There are agreements with licensed companies for waste utilization in place, if required. Future construction waste, if any, will be dumped at the local landfill site.

Noise, vibration, heat radiation and others harmful emissions
In accordance to the technical requirements, all main and auxiliary equipment have heat and noise isolation that provides compliance with the norm, DST 12.1-003.83 (state standard). All equipment and pipelines which exceed 45°C have the necessary isolation. Monitoring of the noise level is done by specially an authorized laboratory of Zuyevska TPP. According to the measured data provided by the laboratory, Zuyevska TPP has no substantial noise impact on the environment, including the village Zugres.

Unit step up transformers: Transformers of auxiliary require open switch gear and are electromagnetic emissions source. The project implementation will not worsen the existing levels of noise, vibration, heat radiation and electromagnetic emissions.

Social impact
Donbas region is characterized by a high population density. Since 1989, there is a trend of density reduction, caused by natural population aging and typical of Ukraine in general. The location of the TPP has positive social impact as it provides around 2,500 jobs.

Due to the high volume of industrial enterprises in the region, such as metallurgical, coke, chemical, mines, etc., all of which contribute to a significant negative impact on environment pollution, the specific negative impact of the TPP is not possible to determine.

Project implementation will lead to decrease of unemployment in the region and a reduction of the total negative environmental impact specifically originating from the plant.

The environmental impact of the project is positive as the project expects to reduce the impact of the existing facility. The impact on the environment of the project is assessed by the Ukrainian authorities in the following way:

The environmental impacts is assessed before obtaining a (re)construction permit. The general principles of evaluating the environmental impact or AEI (OVNS, which is the Ukrainian abbreviation) procedure in Ukraine are described by the national laws “On the environmental protection” and “On the environmental expertise”. According to the national legislation in force, each project or new activity that can be potentially harmful for the environment, must evaluate the environmental impact.

The environmental impacts are analysed after the development of the detailed project design in order to obtain a (re)construction permit. The OVNS document must provide a list of viable project alternatives, a description of the current state of local environment, description of the main pollutants, risk evaluation and an action plan for pollution minimisation. The final OVNS document has to be presented as a separate volume of the project documentation for the evaluation by a state expert company and, optionally may be the subject of public hearing.

The OVNS has been developed in compliance with the Ukrainian legislative base: Law of Ukraine “On environmental protection”, Law of Ukraine “On air protection”, Law of Ukraine “On waste” etc and was approved by the Ministry of Fuel and Energy on 15.08.07.

Outstanding questions connected with baseline and additionality are given in Table 5 below (See CAR16, CL33, CL35, CL36).

4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

According to the modalities for the Determination of JI projects, the AIE shall make publicly available the project design document and receive, within 30 days, comments from Parties, stakeholders and UNFCCC accredited non-governmental organizations and make them publicly available.

Bureau Veritas Certification published the project documents on the website (http://ji.unfccc.int/JI_Projects/DB/YB19L9FFLY7AD3CTGH07TW7V16KYEF/PublicPD

D/2NO4ILVGAVNPWXG2U4MPDRG7JKAY3H/view.html) on 28/10/2009 and invited comments within 26/11/2009 by Parties, stakeholders and non-governmental organizations.
Comments for the JI project "Reconstruction of Units1,2,3 and 4 at Zuyevska Thermal Power Plant" were received from Richard A. Smith, rasmithwa@igc.org, on behalf of FERN, 1C Fosseway Business Center, Stratford Rd., Moreton-in-Marsh GL56 9NQ, England (Jutta Kill, jutta@fern.org) CEE Bankwatch Network, Na Rozcesti 6, 190 00 Praha 9, Czech Republic (Katerina Husova, climate@bankwatch.org) National Ecological Centre of Ukraine, P.O. Box 89, Kyiv, 01025, Ukraine (Irina Stavchuk, irina.stavchuk@necu.org.ua) and dated 24th November 2009. The comment was uploaded on the JISC website by the AIE.

Summary on the comments and response of Skhidenergo Ltd. and Global Carbon and conclusion of Bureau Veritas Certification are presented below in tabular format.

No.	Comments from Richard Smith	Response by Skhidenergo Ltd. and Global Carbon	Conclusion by Bureau VERITAS
1	I. General comment Improving a coal-fired power plant is an inappropriate project for the international climate change mitigation system. A primary objective of mitigation must be a rapid transition to a low-carbon economy so that fossil fuels can be left in the ground to the greatest extent possible. At best, the Zuyevska project does nothing to accomplish this objective. In fact, it is likely that by extending the life of the power plant, this project will actually impede that objective and postpone the necessary shift to a low-carbon economy. By deepening and prolonging Ukraine's dependency on fossil fuels, this project will probably lead to consumption of more coal in the long run than would be burned without the project. The project may also divert resources and attention from better, more sustainable projects, such as improving Ukraine's energy transmission grid, developing alternative and sustainable energy sources, or investing in end-user energy efficiency.	This is a general comment on the policies and implementation of the policies of the Ukrainian Government. Relevant is that local authorities have proved the necessary approval and permits to implement the project as such. The PIN and PDD have been completed in accordance with the JI Guidelines and submitted to the Host Country of approval, it will be the Host Country National Agency that will determine whether this is a valid JI project or not. In addition, Zuyevska TPP represents the latest coal fired TPP connected to the grid and the project is aimed to improve the efficiency including part-load efficiency, rather than extending the lifetime of the plant.	This comment is not related to the determination process.

2	II. Additionality The additionality of the proposed project is questionable. First of all, as indicated on page 5 of the PDD, improvements and post-construction start-up of two of the four power plant units included in the project will be completed by December 2009. That at least half of the crucial construction phase of the project was undertaken and will be finished before any JI approval or funding are finalized or received make the additionality of the project appear very suspect. What evidence shows that the plant's management did not decide to proceed with the facility upgrades before deciding to make the upgrades a JI project?	The additionality has been demonstrated using the most recent version of the CDM approved "Tool for the demonstration and assessment of additionality" version 05.2. By applying a CDM Tool for a JI project, additionality is proven in the most strict and transparent way. There is no requirement whence using this tool to prove: a) That JI was taken into consideration during the planning stage, and b) The JI was decisive when making the decision to progress.	Using the most recent version of the CDM approved "Tool for the demonstration and assessment of additionality" version 05.2 project participants earnestly demonstrated the project additionality.
3	At the very least, the investment analysis included in the PDD is not adequately transparent. Annex 1 to the JI Guidance on Criteria for Baseline Setting and Monitoring Version 2.0 ("JI Baseline Guidance", as well as the CDM "Tool for the demonstration and assessment of additionality" Version 05.2 ("CDM Additionality Tool"), stress that the investment analysis should be traceable and transparent. Point 8 of the investment analysis guidance annex to the CDM Additionality Tool directs that spreadsheet versions of the analysis should be supplied. Point 16 directs that the sensitivity analysis "be reproducible in the associated spreadsheets." No spreadsheets are provided with the PDD, and the investment analysis is not traceable, transparent, or reproducible.	According to the paragraph 8 of the Annex: Guidance on the Assessment of Investment Analysis: (Version 02) of the "Tool for the demonstration and assessment of additionality" version 05.2 the investment case is deemed confidential, it has been made available to the Independent Entity, and there is no requirement to publish to this stage of the process. After completion of the determination process the investment case will be made available to the JISC and uploaded to ji.unfccc.int together with the Determination Report.	Analysis of Global Carbon response on this comment showed that it is sufficient and reasonable.
4	The basis for the investment analysis is unclear. For example,	This had been identified by the Independent Entity and	In PDD version 2.6 this comment was

	the meaning of and calculations in the paragraph at the bottom of PDD p. 20 that starts "The capital cost of reconstruction of unit #2 …" are obtuse. How does 123 MUAH less 18 MUAH equal 95.622 UAH?	has been amended in an updated version of the document.	taken into account and developer provided relevant corrections.
5	The investment analysis appears to exclude cost savings and returns that would result from the investment. These include lower labor, maintenance, and repair costs resulting from the increased reliability of and controls on the refurbished power plant units, and the net present value of the prolonged life of the units beyond the 14 year cash flow calculation period. This is contrary to the direction of point 4 of the investment analysis guidance annex to the CDM Additionality Tool that "[t]he fair value of any project activity assets at the end of the assessment period should be included as a cash inflow in the final year."	The investment analysis includes major overhaul costs of the existing equipment as a deductible from the required investment cost. The project activity is upgrades and refurbishment that cannot be separated from the assets once applied to them. The fair value was considered however, due to the approach of modernizing specific internal components, it was deemed that these would have no value, or only scrap value, at the end of the crediting period.	Analysis of Global Carbon response on this comment showed that it is sufficient and reasonable.
6	The sensitivity analysis of the investment analysis is not convincing or clear, especially with respect to coal price fluctuations. If coal prices increase enough, the investment analysis would not support a finding of additionality. The highest coal price scenario is for a ten percent increase. It is unclear whether this is an average annual rate over an undefined time period or a total increase over that unspecified period. Given the instability of Ukraine's currency and volatility in the energy markets, it seems reasonable to consider that the rise of coal prices could be greater than that considered.	According to the paragraph 17 of the Annex: Guidance on the Assessment of Investment Analysis: (Version 02) of the "Tool for the demonstration and assessment of additionality" version 05.2 departure variations in the sensitivity analysis should at least cover a range of +10% and –10%.	Change in coal price by 10% is sufficient for the assessment of project sensitivity.
7	With a proper sensitivity analysis,	This had been identified by the Independent Entity and	In PDD version 2.6 this comment was

	the investment analysis may well fail to show additionality. The CDM Additionality Tool (at p. 7) includes instructions for the sensitivity analysis: Include a sensitivity analysis that shows whether the conclusion regarding the financial/economic attractiveness is robust to reasonable variations in the critical assumptions. The investment analysis provides a valid argument in favour of additionality only if it consistently supports (for a realistic range of assumptions) the conclusion that the project activity is unlikely to be the most financially/economically attractive … or is unlikely to be financially/economically attractive …. The conclusion of the sensitivity analysis section of the PDD turns these instructions on their head. Instead of evaluating the robustness of the investment analysis conclusion on the additionality of the project, the PDD purports to evaluate the robustness of the economic attractiveness of the baseline, concluding (p. 22) "[s]o although some scenarios could result in IRR exceeding the discount rate the project does not show robustness."	has been amended in an updated version of the document. In summary the instructions listed in the document have been taken selectively and out of context.	taken into account and developer provided relevant corrections.
8	The barrier analysis in the PDD is also unconvincing. The investment barrier is identified as the difficulty in securing local or international financing for plant improvements. However, in March 2007, Ukraine enacted a resolution on partial compensation of interest rates for credits used for new construction and energy efficiency upgrade of fossil fuel power plants,	Additionality has been demonstrated using the "Tool for the demonstration and assessment of additionality" version 05.2, the barrier analysis was added optionally for information only as suggested by the Tool. It has been excluded from an updated version of the document. To comment on the success or otherwise of Government	According the "Tool for the demonstration and assessment of additionality" version 05.2 barrier analysis is an option. In PDD version 2.6 barrier analysis was excluded. Also as already stated by Global

	presumably designed to facilitate investment in improvements like those at Zuyevska by allowing for higher rates of returns at public rather than borrower cost. For the PDD's investment barrier analysis to be correct, this resolution would probably have to be a failure. Is that the case? If so, why?	resolutions is beyond the remit of the PDD. The quoted resolution from March 2007 is the resolution of Cabinet of Ministries of Ukraine #419 'On approval of mechanism of usage of funds from state budget to be used for compensation of loan rates for construction of units at nuclear, hydro- and other power plants, power transmission lines….and also for creating of coal stocks at thermal power plants" The paragraph 3 of the mechanism adopted by the resolution contains the application criteria for funding of such projects which require from the borrower to be more than 50% state owned. It is not applicable in case of Zuyevska TPP, which is a private property and therefore it cannot receive the funding according to the resolution.	Carbon the comment on the success or otherwise of Government resolutions is beyond the determination process.
9	Another barrier identified is the risk that regulation will keep consumer power tariffs low. However, the Zuyevska plant already exists and is already in the business of selling power. The project contemplates increasing the efficiency of energy production rather than increasing energy production capacity so consumer power tariffs are not an issue.	Indeed the project does not increase capacity but it does require investment. This barrier has been excluded from an updated version of the document.	Taken into account. This barrier was excluded from PDD version 2.6.
10	The common practice analysis is totally unavailing as well. As it points out, there have been at least three similar modernization projects undertaken in recent years at Ukrainian coal-fired power plants.	As stated in the PDD there are only two similar projects that the author is aware of, out of a potential of about 100 possible sites. In substep 4b only widely observed and commonly carried out activities are to be taken into account. 2% is not deemed to be widely observed and commonly.	Analysis of Global Carbon response on this comment showed that it is sufficient and reasonable.

11	III. Monitoring The monitoring plan is inadequate because it fails to consider emissions increases due to the production of equipment and construction activities necessary for the project. The installation of new equipment and associated construction at four units of a power plant are not going to be zero-emission activities. Pursuant to point 16 of the JI Monitoring Guidance, "[all] gases and sources/sinks included [within the project boundary] should be explicitly stated. Exclusions of any sources/sinks related to the baseline or the project shall be justified." The PDD does not mention construction-related sources. Given that approximately half of the construction phase of the project has been completed, the emissions related to that work should already have been monitored. Has it been?	We have interpreted the Guidelines in a similar manner to that used for CDM, where construction is only considered if significant, such as deforestation. This is not applicable to this project.	Application of "Approved baseline and monitoring methodology" AM0061 was justified. According this methodology leakage is considered zero. This comment is not applicable to this project.
12	IV. Leakage Leakage is the measureable net change of anthropogenic emissions by sources and/or removal by sinks of greenhouse gases that occurs outside the project boundary that is directly attributable to the JI project. Point 18 of the JI Monitoring Guidance provides that "project participants must undertake an assessment of the potential leakage of the proposed JI project and explain which sources of leakage are to be calculated, and which can be neglected. All sources of leakage that are included shall be quantified and a procedure for an ex ante estimate shall be provided." Contrary to this guidance, the PDD admits to no leakage whatsoever.	No significant leakages were identified. In approved CDM methodology AM0061 which is used in CDM plant rehabilitation project such leakage is considered zero as well.	Leakages are addressed in the PDD according approved methodology AM0061.
13	One source of leakage that should be addressed in the PDD is the emissions from other power	This TPP power plant has emission rates greater than the Ukrainian standard	Analysis of Global Carbon response on this comment

	plants that will generate electricity when the Zuyevska units are down for construction, which is estimated to require three to seven months. Leakage results if these replacement power sources emit more or less greenhouse gases than the pre-project Zuyevska units would. Even if judged to be insignificant, the guidance requires this leakage to be identified and an explanation provided for its exclusion. Given that half of the construction phase of the project has already been completed – two of the four units have already been out of service for construction – actual information on this form of leakage should be available and its evaluation should be included in the PDD.	emission factor of 0.896 tonnesCO_2/MWh, therefore, this could be considered a negative leakage. Following a conservative approach possible emission reduction due to this leakage has been excluded.	showed that it is sufficient and reasonable.
14	Another source is leakage that takes place outside the temporal boundaries of the project, after the end of the crediting period. Presumably, the project is extending the operating life of the Zuyevska plant. Thus, the project may result in more emissions after the end of the crediting period as the plant will be burning coal for a longer time than it would be without the project. This must also be addressed in the PDD.	The proposed upgrades under the project activity do not envisage extension of the operating life of the Zuyevska TPP beyond parameters contained in the permitting and design documentation for the TPP.	Emission reductions are calculated in the PDD till 2020, that is the end the project (equipment) operational lifetime. Comment is not relevant for this case.
15	V. Clarity The PDD lacks clarity. In addition to the confusing parts and missing information identified above, the abbreviations used in Figure 1 of Section A.2. are undefined, and the term “CHP” in Table 1 of Section A.2. is undefined.	Global Carbon welcomes any comments that assist us in improving the clarity of documentations. The PDDs are subject to quality control and scrutinized in detail by the independent entity, despite this, some minor error such as the one defined do manage to slip through. Our apologies.	This comment is reasonable and had been taken into account.

Bureau Veritas Certification has analysed Global Carbon responses on comments, and it is our opinion that they are sufficient and reasonable.

One more comment was received from International NGO "Environment-People-Law" in a letter dated 27 November 2009. As the comment period expired this comment had not been uploaded on the JISC website. All questions addressed in the letter were considered during the determination of the project. Summary of the comments and due account of these by AIE is given below.

1. No description of the project environmental impact on surrounding areas. – Taken into account. Transboundary effect was addressed in the PDD.
2. Letter contains a description of the Ukrainian regulatory requirements to EIA. - EIA is addressed in the revised PDD. The EIA documents (see section 6 References) were verified during site visit and found adequate.
3. Effect of pollution in the sanitary protective zone on the people living there is questioned. – Monitoring of pollution is described in the revised PDD. During the site visit no settlement was observed in the plant vicinity.
4. Information on the project was published more than two years ago, so conditions could changed since that time. - Stakeholders opinion was checked by AIE during the site visit. The Zugres City Head Mr. Vladimir Goncharov expressed positive attitude to the project as an environmentally friendly measure.
5. Host party requirements to the stakeholder's comments are not taken into account. – Rivised PDD addressed the requrements of the Order of the Ministry of environmental protection of July, 17, 2006 # 342.

5 DETERMINATION OPINION

Bureau Veritas Certification has performed a determination of Reconstruction of Units1, 2, 3 and 4 at Zuyevska Thermal Power Plant Project. The determination was performed on the basis of UNFCCC criteria and host country criteria and also on the criteria given to provide for consistent project operations, monitoring and reporting.

The determination consisted of the following three phases: i) a desk review of the project design and the baseline and monitoring plan; ii) follow-up interviews with project stakeholders; iii) the resolution of outstanding issues and the issuance of the final determination report and opinion.

The review of the project design documentation, the subsequent follow-up interviews, and the resolution of the Corrective Action Requests have provided Bureau Veritas Certification with the sufficient evidences to determine the fulfilment of the above stated criteria and to demonstrate that the project is additional.

Project participant/s used the latest tool for demonstration of the additionality. In line with this tool, the PDD provides analysis of investment barriers to determine that the project activity itself is not the baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity. Given that the project is implemented and maintained as designed, the project is likely to achieve the estimated amount of emission reductions.

The review of the project design documentation and the subsequent follow-up interviews have provided Bureau Veritas Certification with sufficient evidence to determine the fulfillment of stated criteria.

A Letter of Approval for Joint Implementation Project "Reconstruction of Units 1, 2, 3 and 4 at Zuyevska Thermal Power Plant" No.1231/23/7 dated 19/08/2010 issued by National Environmental Investment Agency of Ukraine.

A Letter of Approval for Joint Implementation Project "Reconstruction of Units 1, 2, 3 and 4 at Zuyevska Thermal Power Plant" No.2009JI22 dated 07/01/2010 issued by the Ministry of Economic Affairs, the Netherlands.

It is our opinion that the project as described in the Project Design Document, Version 2.8 dated 15/12/2010 meets all the relevant UNFCCC requirements for the determination stage and the relevant host Party criteria, meeting the expectations of interested parties.

The determination is based on the information made available to us and the engagement conditions detailed in this report

6 REFERENCES

Category 1 Documents:
Documents provided by Skhidenergo Ltd. that related directly to the GHG components of the project.

1 PPD Reconstruction of Units1, 2, 3 and 4 at Zuyevska Thermal Power Plant, Revision 1.1, 31/08/2009.
2 PPD Reconstruction of Units1, 2, 3 and 4 at Zuyevska Thermal Power Plant, Revision 2.8, 15/12/2010.
3 Guidelines for Users of the Joint Implementation Project Design Document Form/Version 03, JISC.
4 Joint Implementation Project Design Document Form - Version 01
5 Glossary of JI terms/Version 01, JISC.
6 Guidance on criteria for baseline setting and monitoring. Version 02 JISC.
7 "Combined tool to identify the baseline scenario and demonstrate additionality" (Version 02.2)
8 A Letter of Endorsement of National Environmental Investment Agency # 1036/23/7 dated 3rd of September 2009
9 A Letter of Approval for Joint Implementation Project "Reconstruction of Units 1, 2, 3 and 4 at Zuyevska Thermal Power Plant" No.1231/23/7 dated 19/08/2010 issued by National Environmental Investment Agency of Ukraine
10 A Letter of Approval for Joint Implementation Project "Reconstruction of Units 1, 2, 3 and 4 at Zuyevska Thermal Power Plant" No.2009JI22 dated 07/01/2010 issued by the Ministry of Economic Affairs, the Netherlands
11 Excel file "20091512_SD01 ER_ver2.3.xlsx
12 Excel file "20101215_SD02_CF_ver2.7.xlsx"

DETERMINATION REPORT

Category 2 Documents:
Background documents related to the design and/or methodologies employed in the design or other reference documents.

/1/. Resolution #341 of state environmental impact assessment on reconstruction of units 1, 2, 3 and 4 Zuevskaya TPP from 28.03.2006.
/2/. Positive resolution of state complex assessment #116|284 on the project "Reconstruction of the unit of station #2 SU "Zuevskaya TPP" of Skhidenergo Ltd. from 27.02.2009."
/3/. Resolution of sanitation and epidemiological assessment #05.03/02-07/10084 from 07.03.2006.
/4/. Expert opinion #213 of Central Service for Ukrainian State Investment Expert Examination on corrected estimated documentation techno-economic justification of the reconstruction of the unit #2 of Zuevskaya TPP.
/5/. Techno-economic justification of of the reconstruction of the unit #2 of Zuevskaya TPP. TEJ. Book 3. Explanatory note. Environmental Impact Assessment (EIA) 9-05-2609-PZ.3.
/6/. Newspaper "Rodina" #48 (9464) 27 November - 3 December 2008. Statement of environmental effects of the reconstruction of the unit of st.4 CO of "Zuevskaya TPP" LLC "Skhidenergo ".
/7/. Project on reconstruction of the unit #2. Volume 1.1. General explanatory note/ 9-992-P-PZ.01.1-OCh.
/8/. Project Design Document of JI Project "Reconstruction of Units 1,2,3 and 4 Zuevskaya Thermal Power Plant". Version 1.1. 31 August 2009.
/9/. Certificate of participation of A.I. Bezuglov dated December 2008.
/10/. Certificate of participation of V.I. Nalivaiko dated December 2008.
/11/. Certificate of participation of U.M. Shezdenko dated December 2008.
/12/. Certificate of participation of V.V. Popov dated December 2008.
/13/. Certificate №IA.332-449 of A.A. Babko dated 21/08/2009.
/14/. Certificate №IA.332-451 of S.A. Kukareka dated 21/08/2009.
/15/. Certificate №IA.332-448 of K.I. Grinchenko dated 21/08/2009.
/16/. Annex #1 to the additional agreement #1 dated 25/05/2007 under conrtact #1160207-2Zy22/3.14/KC dated 16/02/2007. Supplement to the Objective of projecting: Feasibility study of the power generating unit st. #1 reconstruction of Zuevskaya TPP.
/17/. Objective of projecting: Skhidenergo Ltd. SU Zuevskaya TPP. Reconstruction of the power generating unit st. #3. Feasibility study. Dated 2009.
/18/. Objective of projecting: Skhidenergo Ltd. SU Zuevskaya TPP. Reconstruction of the power generating unit st. #4. Feasibility study. Dated 09/04/2008.
/19/. Letter #07/32-4163 of Ministry of Fuel and Energy of Ukraine dated 30/06/2009.
/20/. Statement of the state technical entrance examination of the acceptance of reconstructed object for commissioning. Zuevskaya TPP. Power generating unit #2 reconstruction.
/21/. Statement of the work commission of complete construction object willingness for presenting to the state entrance examination dated 30/12/2008.
/22/. Statement of the work commission of the object acceptance for commissioning dated 30/12/2008.
/23/. Statement #06-18/224PK of the verification to the project documentation compliance at the part of following the regulatory requirements for energy saving by complete

construction (reconstracted) industrial objects dated 21/01/2008.

/24/. Decision #584 of permission to the reconstruction of power generating unit #2 of Zuevska TPP dated 26/11/2008.

/25/. Decision #90 of the state entrance commission appointment for commissioning of reconstructed power gererating unit #2 of CO "Zuevskaya TPP "Skhidenergo Ltd. SU dated 25/02/2009.

/26/. Decision #183 of the approval of the state technical entrance commission statement for commissioning of complete construction object - Reconstruction of power generating unit st. #2 of SU "Zuevskaya TPP Skhidenergo Ltd. dated 22/04/2009.

/27/. Decision #117 of permit for reconstruction of power generating unit st. #1 of CO "Zuevska TPP Skhidenergo Ltd. SU dated 11/03/2009.

/28/. Order #297a of industrial commissioning after reconstraction of power generating unit st. #2 of Zuevska TPP dated 22/04/2009.

/29/. Order #1061 of work commission formation for the acceptance centre of devices of power generating unit st. #2 of Zuevskaya TPP from the reconstruction dated 19/12/2008.

/30/. Order #328 of commission formation for acceptance of devices of power generatig unit #2 of Zuevskaya TPP dated 15/10/2008.

/31/. Order #34 of commission formation for acceptance of devices of power generatig unit #2 of Zuevskaya TPP dated 25/03/2008.

/32/. Expert opinion #08 B 07 0025 00.00 3056 P dated 10/12/2008.

Persons interviewed:

List persons interviewed during the determination or persons that contributed with other information that are not included in the documents listed above.

/1/ Roman Serdyukov – Director

/2/ Victor Mashtalap – Deputy Director

/3/ Michail Pantyushenko – Deputy Director

/4/ Valeriy Khomyakov – HR Manager

/5/ Alexandr Udodov – Chief of fueling department

/6/ Nikolai Tetelman – Chief of industrial safety department

/7/ Lidiya Kornienko – Lead specialist of PTO department

/8/ Andrey Klimenko – Chief of OSPR

/9/ Valentyna Zozulya – Chief of ecology department

/10/ Anna Ilyash – Chief of OJSC "Skhidenergo " ecology department

/11/ Vladimir Yakovlev – Chief of fuel and transport department

/12/ Igor Snegin – Chief of electric department

/13/ Alexandr Zakharov – Chif of heat automation and measurings department

/14/ Irina Fesenko – Chief of production-chemical laboratory

/15/ Vladimir Goncharov – Head of Zugres City

/16/ Alexey Doumik - Senior JI Consultant

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APPENDIX A: DETERMINATION PROTOCOL

BUREAU VERITAS CERTIFICATION HOLDING SAS

JI PROJECT DETERMINATION PROTOCOL

Table 1 Mandatory Requirements for Joint Implementation (JI) Projects

REQUIREMENT	REFERENCE	CONCLUSION	Cross Reference to this protocol
1. The project shall have the approval of the Parties involved	Kyoto Protocol Article 6.1 (a)	CAR1: There is no evidence of written project approvals by the Parties involved. Pending untill LoAs by Parties involved will be issued. After finishing of project determination report, the PDD and Determination Report will be presented to	Table 2, Section A.5

REQUIREMENT	REFERENCE	CONCLUSION	Cross Reference to this protocol
		National Environmental Investments Agency of Ukraine for receiving of the Letter of Approval. The Letter of Approval from the country - investor will be provided after approval of project by Ukraine. National Environmental Investment Agency of Ukraine 35, Urytskogo str. 03035 Kiev Ukraine Email: info.neia@gmail.com Mr. Sergii Orlenko Head National Environmental Investment Agency of Ukraine Phone: +380 44 594 9111 Fax: +380 44 594 9115	

REQUIREMENT	REFERENCE	CONCLUSION	Cross Reference to this protocol
		Email: slorlenko@gmail.com CAR1 is closed (See Table 4 below and Category 1 Documents: items 9, 10 above)	
2. Emission reductions, or an enhancement of removal by sinks, shall be additional to any that would otherwise occur	Kyoto Protocol Article 6.1 (b)	OK	Table 2, Section B
3. The sponsor Party shall not acquire emission reduction units if it is not in compliance with its obligations under Articles 5 & 7	Kyoto Protocol Article 6.1 (c)	OK	
4. The acquisition of emission reduction units shall be supplemental to domestic actions for the purpose of meeting commitments under Article 3	Kyoto Protocol Article 6.1 (d)	OK	
5. Parties participating in JI shall designate national focal points for approving JI projects and have in place national guidelines and procedures for the approval of JI projects	Marrakech Accords, JI Modalities, §20	National Environmental Investment Agency of Ukraine	
6. The host Party shall be a Party to the Kyoto Protocol	Marrakech Accords, JI Modalities, §21(a)/24	The Ukraine is a Party (Annex I Party) to the Kyoto Protocol and has ratified the Kyoto Protocol at April 12th, 2004.	
7. The host Party's assigned amount shall have been calculated	Marrakech	This issue cannot be	

REQUIREMENT	REFERENCE	CONCLUSION	Cross Reference to this protocol
and recorded in accordance with the modalities for the accounting of assigned amounts	Accords, JI Modalities, §21(b)/24	answered finally as it is out of the influence of the project participants. In the Initial Report submitted by Ukraine on 29. Dec. 2006 the AAUs are quantified with: 925 362 174.39 (x 5) tCO2-e. (compare http://unfccc.int/national_reports/initial_reports_under_the_kyoto_protocol/items/3765.php)	
8. The host Party shall have in place a national registry in accordance with Article 7, paragraph 4	Marrakech Accords, JI Modalities, §21(d)/24	The designed system of the national registry has been outlined in the Initial Report (see link above). This issue is out of the influence of the project owner. The National Registry is not a direct requirement for project registration.	
9. Project participants shall submit to the independent entity a project design document that contains all information needed for the determination	Marrakech Accords, JI Modalities, §31	OK	
10. The project design document shall be made publicly available and Parties, stakeholders and UNFCCC accredited observers shall be invited to, within 30 days, provide comments	Marrakech Accords, JI Modalities, §32	28 Oct 09 - 26 Nov 09 CL1 : Independent Entity Richard Smith provided	

REQUIREMENT	REFERENCE	CONCLUSION	Cross Reference to this protocol
		comments by the proposed project activity dated 24th November 2009. Please provide response. CL1 is closed (See Table 4 below)	
11. Documentation on the analysis of the environmental impacts of the project activity, including transboundary impacts, in accordance with procedures as determined by the host Party shall be submitted, and, if those impacts are considered significant by the project participants or the Host Party, an environmental impact assessment in accordance with procedures as required by the Host Party shall be carried out	Marrakech Accords, JI Modalities, §33(d)	The environmental impacts is assessed before obtaining a (re)construction permit. The general principles of evaluating the environmental impact (OVNS, which is the Ukrainian abbreviation) procedure in Ukraine are described by the national laws "On the environmental protection" and "On the environmental expertise". According to the national legislation in force, each project or new activity that can be potentially harmful for the environment, must evaluate the environmental impact.	Table 2, Section F
12. The baseline for a JI project shall be the scenario that reasonably represents the GHG emissions or removal by sources that would occur in absence of the proposed project	Marrakech Accords, JI Modalities,	OK	Table 2, Section B

REQUIREMENT	REFERENCE	CONCLUSION	Cross Reference to this protocol
	Appendix B		
13. A baseline shall be established on a project-specific basis, in a transparent manner and taking into account relevant national and/or sectoral policies and circumstances	Marrakech Accords, JI Modalities, Appendix B	OK	Table 2, Section B
14. The baseline methodology shall exclude to earn ERUs for decreases in activity levels outside the project activity or due to force majeure	Marrakech Accords, JI Modalities, Appendix B	OK	Table 2, Section B
15. The project shall have an appropriate monitoring plan	Marrakech Accords, JI Modalities, §33(c)	OK	Table 2, Section D
16. Are project participants authorized by a Party involved	JISC "Modalities of communication of Project Participants with the JISC" Version 01, Clause A.3	See CAR1. Conclusion is pending until Letters of Approval authorizing the project participants by Parties involved will be issued. CAR1 is closed (See Table 4 below and Category 1 Documents: items 9, 10 above)	Table 2, Section A

Table 2 Requirements Checklist

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
A. General Description of the project					
A.1 Title of the project					
A.1.1. Is the title of the project activity presented?	1,2,3, 4	DR	Reconstruction of Units1,2,3 and 4 at Zuyevska Thermal Power Plant	OK	OK
A.1.2. Is the current version number of the document presented?	1,2,3, 4	DR	Yes, version 2.8	OK	OK
A.1.3. Is the date when the document was completed presented?	1,2,3, 4	DR	Dated December 15, 2010	OK	OK
A.2. Description of the project					
A.2.1. Is the purpose of the project activity included?	1,2,3, 4	DR	The proposed project is intended to modernise of all for units at the TPP in order to: • Improve energy efficiency and reduce auxiliary equipment consumption • Improve reliability and availability • Improve part-load efficiency • Introduce modern control systems • Reduce the dust emission • Reduce SO_x emission	OK	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
A.2.2. Is it explained how the proposed project activity reduces greenhouse gas emissions?	1,2,3, 4	DR	See section A.2 of the PDD. Please, explain in section A.2 of PDD how the proposed project activity reduces greenhouse gas emissions.	CL2	OK
A.3. Project participants					
A.3.1. Are project participants and Party(ies) involved in the project listed?	1,2,3, 4	DR	Ukraine (Host party): Skhidenergo Ltd Netherlands: Global Carbon BV	OK	OK
A.3.2. Are project participants authorized by a Party involved?	1,2,3, 4	DR	See section 1 (CAR1) of the Table1 above	-	-
A.3.3. The data of the project participants are presented in tabular format?	1,2,3, 4	DR	See section A.3 of the PDD	OK	OK
A.3.4. Is contact information provided in annex 1 of the PDD?	1,2,3, 4	DR	See Annex 1 of the PDD	OK	OK
A.3.5. Is it indicated, if it is the case, if the Party involved is a host Party?	1,2,3, 4	DR	Ukraine (Host Party)	OK	OK
A.4. Technical description of the project					
A.4.1. Location of the project activity					
A.4.1.1. Host Party(ies)	1,2,3, 4	DR	Ukraine	OK	OK
A.4.1.2. Region/State/Province etc.	1,2,3,	DR	Donetsk oblast (province).	OK	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
	4				
A.4.1.3. City/Town/Community etc.	1,2,3, 4	DR	Village Zugres, located about 40 km west of Donetsk, the regional capital of Donetsk Oblast in southwest Ukraine.	OK	OK
A.4.1.4. Detail of the physical location, including information allowing the unique identification of the project. (This section should not exceed one page)	1,2,3, 4	DR	See section A.4.1.4 of the PDD	OK	OK
A.4.2. Technology(ies) to be employed, or measures, operations or actions to be implemented by the project					
A.4.2.1. Does the project design engineering reflect current good practices?	1,2,3, 4	DR	See section A.4.2 of the PDD. Please, clarify in PDD if the project design engineering reflect current good practices	CL3	OK
A.4.2.2. Does the project use state of the art technology or would the technology result in a significantly better performance than any commonly used technologies in the host country?	1,2,3, 4	DR	See section A.4.2 of the PDD. Please, clarify in PDD if the project use state of the art technology or would the technology result in a significantly better performance than any commonly used technologies in the host country.	CL4	OK
A.4.2.3. Is the project technology likely to be substituted by other or more efficient technologies within the project period?	1,2,3, 4	DR	Please, clarify in PDD if the project technology is likely to be substituted by other or more efficient technologies within the project period.	CL5	OK
A.4.2.4. Does the project require extensive initial training and maintenance efforts in order to work as presumed during the project period?	1,2,3, 4	DR	Please, clarify in PDD if the project requires extensive initial training and maintenance efforts in order to work as presumed during the project period.	CL6	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
A.4.2.5. Does the project make provisions for meeting training and maintenance needs?	1,2,3, 4	DR	Please, clarify in PDD if the project makes provisions for meeting training and maintenance needs	CL7	OK
A.4.3. Brief explanation of how the anthropogenic emissions of greenhouse gases by sources are to be reduced by the proposed JI project, including why the emission reductions would not occur in the absence of the proposed project, taking into account national and/or sectoral policies and circumstances					
A.4.3.1. Is it stated how anthropogenic GHG emission reductions are to be achieved? (This section should not exceed one page)	1,2,3, 4,5,6	DR	See section A.4.3 of the PDD	OK	OK
A.4.3.2. Is it provided the estimation of emission reductions over the crediting period?	1,2,3, 4	DR	Total estimated emission reductions over the crediting period (tones of CO2 equivalent): within 2008-2012 - 807,803 tCO_2eq, within 2013 – 2020 - 2,403,641 tCO_2eq.	OK	OK
A.4.3.3. Is it provided the estimated annual reduction for the chosen credit period in tCO_2e?	1,2,3, 4	DR	The estimated annual reduction for the chosen credit period is about: 187,056 tCO_2e	OK	OK
A.4.3.4. Are the data from questions A.4.3.2 to A.4.3.4 above presented in tabular format?	1,2,3, 4	DR	See section A.4.3.1 of the PDD.	OK	OK
A.5. Project approval by the Parties involved					
A.5.1. Are written project approvals by the Parties involved attached?	1,2,3, 4	DR	See section 1 (CAR1) of the Table1 below	-	-
B. Baseline					

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
B.1. Description and justification of the baseline chosen					
B.1.1. Is the chosen baseline described?	1,2,3, 4,6,7	DR	Please, clarify if was used methodology AM0061 or else and specify version of methodology.	CL8	OK
B.1.2. Is it justified the choice of the applicable baseline for the project category?	1,2,3, 4,6,7	DR	See section B.1 of PDD.	OK	OK
B.1.3. Is it described how the methodology is applied in the context of the project?	1,2,3, 4,6,7	DR	Description how the methodology is applied in the context of the project is not provided.	CAR2	OK
B.1.4. Are the basic assumptions of the baseline methodology in the context of the project activity presented (See Annex 2)?	1,2,3, 4,5,6	DR	Please, clarify the basic assumptions of the baseline methodology in the context of the project activity presented (See Annex 2)	CL9	OK
B.1.5. Is all literature and sources clearly referenced?	1,2,3, 4	DR	See section B.1 of the PDD.	OK	OK
B.2. Description of how the anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the JI project					
B.2.1. Is the proposed project activity additional?	1,2,3, 4,6,7	DR	**Step 1 Identification of alternatives.** Please note that Additionality Tool ver. 05.2 foresees division of step 1 into two substeps (1a and 1b). Please rework the paragraph accordingly. Your aim in this step is to prove that all/several alternatives are not prevented from implementation by laws and mandatory regulations. So please indicate that all identified alternatives (1-6) are	CL10	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			consistent with law of Ukraine and mandatory regulations in force. Please note that the statement that alternative 6 is the only feasible and credible alternative is rather confusing, I would suggest eliminating it.		
			Step 2 investment analysis. Please note that the first sentence of the second paragraph of substep 2a is incorrect. There is no obstacles for using option II, so it is better to erase this sentence at all.	CL11	OK
			Benchmark analysis is the proper method for the present project. Using external benchmark is sufficiently justified by the developer. Please note that approach (a) is used, not 4c as indicated in the text.	CL12	OK
			I would also recommend moving calculation of the benchmark to the sub-step 2B in order the reader could easily see the actual value of the benchmark (IRR derived from the benchmark rate).	CL13	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			The actual value of the benchmark is based on obsolete data (bond rates of one particular issue of 25.01.2006) and can not be accepted for investment analysis. Please note that the OVGZ (Ukrainian government bonds) rates during October 2009 fluctuated between 22,7% and 30%. The average may be used as the benchmark, which is 26,35%. Also note that while the developer indicates the bond rate in the text as 9,5%, the value used in Excel tables is 7.5%. Please avoid such discrepancies.	CAR3	OK
			The developer is using fixed prices in Euro for its financial calculations. At the same time IRR benchmark calculated based on the nominal values contradicting with fixed prices of the financial model. In such instance not nominal but real discount rate or IRR (i.e. bond rate adjusted for inflation rate) shall be applied in order to account for financial calculations made in fixed prices. Another option (most recommended) is to use forecasted prices. For example you may adjust future prices for energy resources and other costs for expected inflation level in Ukraine which is around 12% each year. Please note that if you are	CAR4	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			using the benchmark denominated in UAH you shall make all calculation in UAH as well. Please note that exchange rates used in the financial model and the text are outdated. Please use the current EUR/UAH exchange rates. The same applies to the prices for coal, natural gas and mazut. The prices indicated in the document now are very far from reality and shall be updated.	CL14	OK
			If you choose to make all calculations in UAH in order to be consistent with the benchmark please eliminate the conversion of the capital costs for reconstruction in the sub-step 2c from UAH to EUR as unnecessary. Indication of the exchange rate applied for project calculations in the first paragraph of sub-step 2c will be sufficient instead.	CL15	OK
			Please note that actually cash flow calculations are made for the period of 2007-2019 (13 years). Please correct the relevant sentence in sub-step 2c accordingly. In general this period of	CL16	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			calculations is well justified by the expected residual lifetime of machinery and equipment. Please note that the Guidance article 4 requires the fair value of the project assets at the end of the end of assessment period to be included in the cash flow for the final year. The use of the book value or potential selling price (scrap value) may be used for this purpose.	CL17	OK
			Slight discrepancy exists between baseline coal consumption indicated in 20091028 SD02.xls and 20091009_SD01_ER_ver2.0.xls excel spreadsheets. Please correct whichever is wrong.	CL18	OK
			Sensitivity analysis provides reasonable review of possible price variations. At the same time separate consideration of mazut and natural gas prices fluctuations looks excessive. They have miserable impact on the model and it is reasonable to assume that the prices for all three energy resources will correlate tightly and separate changes	CAR5	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			in the long-term period are unlikely so it is better to combine these three scenarios into one. Please submit the spreadsheets with calculation of deviation scenarios indicating formulas in order the reader could reproduce and check your results as required by the Guidance for the Assessment of Investment analysis. The figures used as the forecast energy output for 2009-2011 (6 210 000 MWh each year) contradict with linear approximation made in your file 20091009_SD01_ER_ver2.0.xls. Please provide justification for expected production capacity of the power plant for that and subsequent periods.	CAR6	OK
B.2.2. Is the baseline scenario described?	1,2,3, 4	DR	See section B.1 of the PDD. Continuation of operation of existing power plant.	OK	OK
B.2.3. Is the project scenario described?	1,2,3, 4	DR	Please provide in section B.2 of the PDD description of the project scenario.	CL19	OK
B.2.4. Is an analysis showing why the emissions in the baseline scenario would likely exceed the emissions in the project scenario included?	1,2,3, 4,5	DR	See section B.2 of the PDD.	OK	OK
B.2.5. Is it demonstrated that the project activity itself is not a likely baseline scenario?	1,2,3, 4,6	DR	See section B.2 of the PDD.	OK	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
B.2.6. Are national policies and circumstances relevant to the baseline of the proposed project activity summarized?	1,2,3, 4	DR	See section B.2 of the PDD. Please provide relevant state norms on power tariffs regulation. See section B.1 (3.3. Other barriers)	CL20	OK
B.3. Description of how the definition of the project boundary is applied to the project activity					
B.3.1. Are the project's spatial (geographical) boundaries clearly defined?	1,2,3, 4	DR	See section B.3 of the PDD	OK	OK
B.4. Further baseline information, including the date of baseline setting and the name(s) of the person(s)/entity(ies) setting the baseline					
B.4.1. Is the date of the baseline setting presented (in DD/MM/YYYY)?	1,2,3, 4	DR	Please present the date of completing in the DD/MM/YYYY format.	CAR7	OK
B.4.2. Is the contact information provided?	1,2,3, 4	DR	See section B.4 of the PDD. Name of person/entity setting the baseline: Global Carbon BV	OK	OK
B.4.3. Is the person/entity also a project participant listed in Annex 1 of PDD?	1,2,3, 4	DR	Yes, the person/entity also a project participant is listed in Annex 1 of PDD. See annex 1 of the PDD	OK	OK
C. Duration of the small-scale project and crediting period					
C.1. Starting date of the project					
C.1.1. Is the project's starting date clearly defined?	1,2,3, 4,5	DR	Please clarify in PDD why the date 30 December 2008 was accepted as the	CL21	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			project's starting date clearly defined?		
C.2. Expected operational lifetime of the project					
C.2.1. Is the project's operational lifetime clearly defined in years and months?	1,2,3, 4	DR	Please, provide the project's operational lifetime in years and months	CAR8	OK
C.3. Length of the crediting period					
C.3.1. Is the length of the crediting period specified in years and months?	1,2,3, 4	DR	Please, provide the length of the crediting period in years and months	CAR9	OK
D. Monitoring Plan					
D.1. Description of monitoring plan chosen					
D.1.1. Is the monitoring plan defined?	1,2,3, 4,6	DR	See section D.1 of the PDD. Methodology that was used for monitoring is not provided. If Approach is own, please provide sources that was used for it development.	CAR10 CL22	OK OK
D.1.2. Option 1 – Monitoring of the emissions in the project scenario and the baseline scenario.	1,2,3, 4,7	DR	See section D.1 of the PDD. Carbon Emission Factor in PDD and SD1 (version 2.0) is indicated different. Please, clarify it. Please, clarify in PDD why thermal energy produced by TPP is not used in calculations.	CL23 CL24	OK OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
D.1.3. Data to be collected in order to monitor emissions from the project, and how these data will be archived.	1,2,3, 4,7	DR	Refer to section D.1.1.1 of PDD.	OK	OK
D.1.4. Description of the formulae used to estimate project emissions (for each gas, source etc,; emissions in units of CO2 equivalent).	1,2,3, 4	DR	Refer to section D.1.1.2 of PDD. Please, clarify why oxidation factor of the fuel was not used in calculations?	CL25	OK
D.1.5. Relevant data necessary for determining the baseline of anthropogenic emissions of greenhouse gases by sources within the project boundary, and how such data will be collected and archived.	1,2,3, 4	DR	Refer to section D.1.1.3 of PDD. Amount of electricity supplied by TPP to the grid in year (EL_y) can't be measured. It must be difference between amount of produced electricity and amount electricity consumed on auxiliaries (included electricity consumed from grid).	CAR11	OK
D.1.6. Description of the formulae used to estimate baseline emissions (for each gas, source etc, emissions in units of CO2 equivalent).	1,2,3, 4	DR	Refer to section D.1.1.4 of PDD. Annual specific fuel consumption changed in 2002-2004 (see Table 3: "Calculation of baseline specific fuel consumption" of the PDD) without JI project activity. Please justify using of fixed specific fuel consumption.	CL26	OK
D.1.7. Option 2 – Direct monitoring of emissions reductions from the project (values should be	1,2,3, 4	DR	N/A	OK	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
consistent with those in section E)					
D.1.8. Data to be collected in order to monitor emission reductions from the project, and how these data will be archived.	1,2,3, 4	DR	N/A	OK	OK
D.1.9. Description of the formulae used to calculate emission reductions from the project (for each gas, source etc,; emissions/emission reductions in units of CO2 equivalent).	1,2,3, 4	DR	N/A	OK	OK
D.1.10. If applicable, please describe the data and information that will be collected in order to monitor leakage effects of the project.	1,2,3, 4,6	DR	Please justify that the leakage is not expected.	CL27	OK
D.1.11. Description of the formulae used to estimate leakage (for each gas, source etc,; emissions in units of CO2 equivalent).	1,2,3, 4	DR	N/A	OK	OK
D.1.12. Description of the formulae used to estimate emission reductions for the project (for each gas, source etc,; emissions in units of CO2 equivalent).	1,2,3, 4	DR	Refer to section D.1.4 of PDD	OK	OK
D.1.13. Is information on the collection and archiving of information on the environmental impacts of the project provided?	1,2,3, 4	DR, I	See section D.1.5 of PDD. Please, clarify in PDD why this item is not applicable.	CL28	OK
D.1.14. Is reference to the relevant host Party regulation(s) provided?	1,2,3, 4	DR, I	Please, provide reference to the relevant host Party regulation(s)	CL29	OK
D.1.15. If not applicable, is it stated so?	1,2,3, 4	DR, I	Reference to section D.1.14 (CL29) above	-	-
D.2. Qualitative control (QC) and quality assurance (QA) procedures undertaken for data monitored					

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
D.2.1. Are there quality control and quality assurance procedures to be used in the monitoring of the measured data established?	1,2,3, 4	DR	See section D.2 of the PDD.	OK	OK
D.3. Please describe of the operational and management structure that the project operator will apply in implementing the monitoring plan					
D.3.1. Is it described briefly the operational and management structure that the project participants(s) will implement in order to monitor emission reduction and any leakage effects generated by the project activity	1,2,3, 4	DR	See section D.3 of the PDD.	OK	OK
D.4. Name of person(s)/entity(ies) establishing the monitoring plan					
D.4.1. Is the contact information provided?	1,2,3, 4	DR	Name of person/entity determining the monitoring plan: Global Carbon B.V. Alexey Doumik Please, provide Alexey Doumik contact information.	CL30	OK
D.4.2. Is the person/entity also a project participant listed in Annex 1 of PDD?	1,2,3, 4	DR	See Annex 1 of the PDD.	OK	OK
E. Estimation of greenhouse gases emission reductions					
E.1. Estimated project emissions					
E.1.1. Are described the formulae used to estimate	1,2,3,	DR	Description of the formulae used to estimate	CAR12	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
anthropogenic emissions by source of GHGs due the project?	4,7		anthropogenic emissions by source of GHGs due the project is not provided.		
E.1.2. Is there a description of calculation of GHG project emissions in accordance with the formula specified in for the applicable project category?	1,2,3, 4,7	DR	Description of calculation of GHG project emissions in accordance with the formula specified in for the applicable project category is not provided.	CAR13	OK
E.1.3. Have conservative assumptions been used to calculate project GHG emissions?	1,2,3, 4	DR	Please clarify if conservative assumptions are used to calculate project GHG emissions	CL31	OK
E.2. Estimated leakage					
E.2.1. Are described the formulae used to estimate leakage due to the project activity where required?	1,2,3, 4,7	DR	Leakage is not expected.	OK	OK
E.2.2. Is there a description of calculation of leakage in accordance with the formula specified in for the applicable project category?	1,2,3, 4	DR	Refer to E.2.1 above.	-	-
E.2.3. Have conservative assumptions been used to calculate leakage?	1,2,3, 4,7	DR	Refer to E.2.1 above.	-	-
E.3. The sum of E.1 and E.2.					
E.3.1. Does the sum of E.1 and E.2 represent the project activity emissions?	1,2,3, 4	DR	Refer to E.2.1 above.	-	
E.4. Estimated baseline emissions					
E.4.1. Are described the formulae used to estimate the anthropogenic emissions by source of GHGs in the baseline using the baseline methodology for the applicable project category?	1,2,3, 4	DR	Description of formulae used to estimate the anthropogenic emissions by source of GHGs in the baseline using the baseline methodology for the applicable project	CAR14	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			category is not provided.		
E.4.2. Is there a description of calculation of GHG baseline emissions in accordance with the formula specified in for the applicable project category?	1,2,3, 4	DR	Description of calculation of GHG baseline emissions in accordance with the formula specified in for the applicable project category is not provided.	CAR15	OK
E.4.3. Have conservative assumptions been used to calculate baseline GHG emissions?	1,2,3, 4	DR	Please clarify in section E.4 of PDD if conservative assumptions are used to calculate baseline GHG emissions	CL32	OK
E.5. Difference between E.4. and E.3. representing the emission reductions of the project					
E.5.1. Does the difference between E.4. and E.3. represent the emission reductions due to the project during a given period?	1,2,3, 4	DR	Refer to E.5 of the PDD.	OK	OK
E.6. Table providing values obtained when applying formulae above					
E.6.1. Is there a table providing values of total CO_2 abated?	1,2,3, 4	DR	Table presented in section E.6 of the PDD	OK	OK
F. Environmental Impacts					
F.1. Documentation on the analysis of the environmental impacts of the project, including transboundary impacts, in accordance with procedures as determined by the host Party					
F.1.1. Has an analysis of the environmental impacts of the project been sufficiently described?	1,2,3, 4	DR, I	Section F.1 of PDD gives sufficient environment impact analysis description.	OK	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
F.1.2. Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, is and EIA approved?	1,2,3, 4	DR, I	Please, clarify if are any requirements for an Environmental Impact Assessment (EIA)?	CL33	OK
F.1.3. Are the requirements of the National Focal Point being met?	1,2,3, 4	DR, I	The National Focal Point issued Letter of Endorsement.	OK	OK
F.1.4. Will the project create any adverse environmental effects?	1,2,3, 4	DR, I	Adverse environmental effects are not expected.	OK	OK
F.1.5. Are transboundary environmental considered in the analysis?	1,2,3, 4	DR, I	Transboundary effects are not considered (no effect can be deduced only). Please, specify if the project has no transboundary impact. If no, clarify why it is not expected.	CAR16	OK
F.1.6. Have identified environmental impacts been addressed in the project design?	1,2,3, 4	DR, I	See section F of the PDD. Adverse environmental effects are not expected.	OK	OK
***G.* Stakeholders' comments**					
G.1. Information on stakeholders' comments on the project, as appropriate					
G.1.1. Is there a list of stakeholders from whom comments on the project have been received?	1,2,3, 4,8	DR	Section G.1 of PDD	OK	OK
G.1.2. The nature of comments is provided?	1,2,3, 4	DR	Section G.1 of PDD	OK	OK
G.1.3. Has due account been taken of any stakeholder	1,2,3,	DR	Section G.1 of PDD	OK	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
comments received?	4				

Table 3 Baseline and Monitoring Methodologies: Own format

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
1. Baseline Methodology					
1. 1. General					
1.1.1. Does the baseline cover emissions from all gases, sectors and source categories listed in Annex A, and anthropogenic removals by sinks, within the project boundary?	1,2,6	DR I	Section B.3 of the PDD establishes project boundaries. Only CO2 emissions are taken into account by the project.	OK	OK
1.1.2. Is baseline established on a project-specific basis and/or using a multi-project emission factor?	1,2,6	DR I	A multi-project emission factor is used for baseline establishing.	OK	OK
1.1.3 Is baseline established in a transparent manner with regard to the choice of approaches, assumptions, methodologies, parameters, data sources and key factors?	1,2,6	DR I	See items B.1.1 (CL8), B.1.3 (CAR2), B.1.4 (CL9) above.	-	-
1.1.4 Is baseline established taking into account relevant national and/or sectoral policies and circumstances, such as sectoral reform initiatives, local fuel availability, power sector expansion plans, and the economic situation in the project sector?	1,2,6	DR	See items B.2.6 (CL20) above.	-	-
1.1.5 Is baseline established in such a way that ERUs	1,2,6	DR	Baseline does not envisage earning ERUs for	OK	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
cannot be earned for decreases in activity levels outside the project activity or due to *force majeure?*		I	activity level decrease outside the project or due to *force majeure.*		
1.1.6 Is baseline established taking account of uncertainties and using conservative assumptions?	1,2,6	DR I	Please, clarify how uncertainties were taken into account.	CL34	OK
1.2. Additionality					
1.2.1. Was the additionality of the project activity demonstrated and assessed?	1,2,6	DR	See section B.2.1 above	-	-
2. Monitoring Methodology					
2.1. Monitoring plan					
2.1.1. Is a monitoring plan included?	1,2,6	DR I	Yes, monitoring plan is included.	OK	OK
2.1.2. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimating or measuring anthropogenic emissions by sources and/or anthropogenic removals by sinks of greenhouse gases occurring within the project boundary during the crediting period?	1,2,6	DR I	Refer to section D.1.1.1 of PDD.	OK	OK
2.1.3. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining the baseline of anthropogenic emissions by sources and/or anthropogenic removals by sinks of greenhouse gases within the project boundary during the crediting period?	1,2,6	DR I	Refer to section D.1.1.3 of PDD. See items D.1.5 (CAR11) above.	-	-
2.1.4. Does the monitoring plan provide for the identification of all potential sources of, and the collection and archiving of data on increased anthropogenic emissions by sources and/or reduced anthropogenic	1,2,6	DR	Increase of anthropogenic emissions outside the project boundary that are significant and reasonably attributable to the project during the crediting period is not anticipated.	OK	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
removals by sinks of greenhouse gases outside the project boundary that are significant and reasonably attributable to the project during the crediting period?					
2.1.5. Does the project boundary encompass all anthropogenic emissions by sources and/or removals by sinks of greenhouse gases under the control of the project participants that are significant and reasonably attributable to the JI project?	1,2,6	DR	Significant anthropogenic emissions by sources and/or removals by sinks of greenhouse gases under the control of the project participants are envisaged by the project. Validated onsite.	OK	OK
2.1.6. Does the monitoring plan provide for the collection and archiving of information on environmental impacts, in accordance with procedures as required by the host Party, where applicable?	1,2,6	DR	See items D.1.13 (CL28) above.	-	-
2.1.7. Does the monitoring plan provide for quality assurance and control procedures for the monitoring process?	1,2,6	DR	See section D.2 of the PDD	OK	OK
2.1.8. Does the monitoring plan provide for procedures for the periodic calculation of the reductions of anthropogenic emissions by sources and/or enhancements of anthropogenic removals by sinks by the proposed JI project, and for leakage effects, if any?	1,2,6	DR I	The monitoring plan provides formulae for the periodic calculation of the reductions of anthropogenic emissions (see section D.1.1.2.). Leakage is not applicable.	OK	OK
2.1.9. Does the monitoring plan provide for documentation of all steps involved in the calculations?	1,2,6	DR I	See items D.1.5 (CAR11) above.	-	-
2.2. Quality Control (QC) and Quality Assurance (QA) Procedures					
2.2.1. Did all measurements use calibrated measurement equipment that is regularly checked for its functioning?	1,2,6	DR I	Control of the measuring equipment is implemented and followed, that was validated onsite.	OK	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
2.2.2 Is frequency of monitoring the parameters defined?	1,2,6	DR I	Frequency of monitoring the parameters is defined.	OK	OK

Table 4 Legal requirements

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
1. Legal requirements					
1.1. Is the project activity environmentally licensed by the competent authority?	1,2	DR, I	Proposed project activity is not capital construction. Please clarify in PDD is the project activity environmentally licensed by the competent authority	CL35	OK
1.2. Are there conditions of the environmental permit? In case of yes, are they already being met?	1,2	DR, I	Please clarify in PDD if conditions of the environmental permit?	CL36	OK
1.3. Is the project in line with relevant legislation and plans in the host country?	1,2	DR, I	See items 1.1 (CL35) and 1.2 (CL36) above	-	-

Table 5 Resolution of Corrective Action and Clarification Requests

Draft report clarifications and corrective action requests by determination team	Ref. to checklist question in tables 2, 3 and 4	Summary of project owner response	Determination team conclusion
Corrective Action Request 1 (CAR1): There is no evidence of written project approvals by the Parties involved. Pending untill LoAs by Parties involved will be issued.	Table 1, question 1	There is no evidence of written project approvals by the Parties involved. Pending untill LoAs by Parties involved will be issued. After finishing of project determination report, the PDD and Determination Report will be presented to National Environmental Investments Agency of Ukraine for receiving of the Letter of Approval. The Letter of Approval from the country - investor will be provided after approval of project by Ukraine. National Environmental Investment Agency of Ukraine 35, Urytskogo str. 03035 Kiev Ukraine Email: info.neia@gmail.com Mr. Sergii Orlenko	A Letter of Approval for Joint Implementation Project "Reconstruction of Units 1, 2, 3 and 4 at Zuyevska Thermal Power Plant" No.1231/23/7 dated 19/08/2010 issued by National Environmental Investment Agency of Ukraine. A Letter of Approval for Joint Implementation Project "Reconstruction of Units 1, 2, 3 and 4 at Zuyevska Thermal Power Plant" No.2009JI22 dated 07/01/2010 issued by the Ministry of Economic Affairs, the Netherlands. Letters of Approval were checked. Corrective Action Request is closed.

Draft report clarifications and corrective action requests by determination team	Ref. to checklist question in tables 2, 3 and 4	Summary of project owner response	Determination team conclusion
		Head National Environmental Investment Agency of Ukraine Phone: +380 44 594 9111 Fax: +380 44 594 9115 Email: slorlenko@gmail.com	
Corrective Action Request 2 (CAR2): Description how the methodology is applied in the context of the project is not provided.	Table 2, question B.1.3	It has been corrected in PDD ver 2.8 dated 15/12/10. A JI specific approach was selected as it is described in sections B.1 and D.	PDD version 2.8 was checked. Corrective Action Request is closed.
Corrective Action Request 3 (CAR3): The actual value of the benchmark is based on obsolete data (bond rates of one particular issue of 25.01.2006) and can not be accepted for investment analysis. Please note that the OVGZ (Ukrainian government bonds) rates during October 2009 fluctuated between 22,7% and 30%. The average may be used as the benchmark, which is 26,35%. Also note that while the developer indicates the bond rate in the text as 9,5%, the value used in Excel tables is 7.5%. Please avoid such discrepancies.	Table 2, question B.2.1	IRR benchmark has been updated, please see supporting document 20101215_SD02_CF_ver 2.7.	Supporting document 20101215_SD02_CF_ver 2.7 was checked. Corrective Action Request is closed.

Draft report clarifications and corrective action requests by determination team	Ref. to checklist question in tables 2, 3 and 4	Summary of project owner response	Determination team conclusion
Corrective Action Request 4 (CAR4): The developer is using fixed prices in Euro for its financial calculations. At the same time IRR benchmark calculated based on the nominal values contradicting with fixed prices of the financial model. In such instance not nominal but real discount rate or IRR (i.e. bond rate adjusted for inflation rate) shall be applied in order to account for financial calculations made in fixed prices. Another option (most recommended) is to use forecasted prices. For example you may adjust future prices for energy resources and other costs for expected inflation level in Ukraine which is around 12% each year. Please note that if you are using the benchmark denominated in UAH you shall make all calculation in UAH as well.	Table 2, question B.2.1	Corrected by modifying the cash flow calculations in supporting document 20101215_SD02_CF_ver2.7 (option of forecasted prices was used)	Supporting document 20101215_SD02_CF_ver2.7 was checked. Corrective Action Request is closed.
Corrective Action Request 5 (CAR5): Sensitivity analysis provides reasonable review of possible price variations. At the same time separate consideration of mazut and natural gas prices fluctuations looks excessive. They have miserable impact on	Table 2, question B.2.1	Corrected, please, see the supporting document 20101215_SD02_CF_ver2.7	Supporting document 20101215_SD02_CF_ver2.7 was checked. Corrective Action Request is closed.

Draft report clarifications and corrective action requests by determination team	Ref. to checklist question in tables 2, 3 and 4	Summary of project owner response	Determination team conclusion
the model and it is reasonable to assume that the prices for all three energy resources will correlate tightly and separate changes in the long-term period are unlikely so it is better to combine these three scenarios into one. Please submit the spreadsheets with calculation of deviation scenarios indicating formulas in order the reader could reproduce and check your results as required by the Guidance for the Assessment of Investment analysis.			
Corrective Action Request 6 (CAR6): The figures used as the forecast energy output for 2009-2011 (6 210 000 MWh each year) contradict with linear approximation made in your file 20091009_SD01_ER_ver2.0.xls. Please provide justification for expected production capacity of the power plant for that and subsequent periods.	Table 2, question B.2.1	A chart with linear approximation is no more used in PDD since ver. 2.8 and in the supporting documents. Please, note that we have used the forecast for 2009-2012 power output	PDD version 2.8 was checked. Corrective Action Request is closed.
Corrective Action Request 7 (CAR7): Please present the date of completing in the DD/MM/YYYY format.	Table 2, question B.4.1	Date of completion of the baseline study: 09/02/2010 Corrected in PDD ver.2.8.	PDD version 2.8 was checked. Corrective Action Request is closed.

Draft report clarifications and corrective action requests by determination team	Ref. to checklist question in tables 2, 3 and 4	Summary of project owner response	Determination team conclusion
Corrective Action Request 8 (CAR8): Please, provide the project's operational lifetime in years and months	Table 2, question C.2.1	Until 2020, at the least (13 years or 156 months). Corrected in PDD ver.2.8.	PDD version 2.8 was checked. Corrective Action Request is closed.
Corrective Action Request 9 (CAR9): Please, provide the length of the crediting period in years and months	Table 2, question C.3.1	Four years and two days (48 months and two days). From 30/12/2008 to 31/12/2012. Corrected in PDD ver.2.8.	PDD version 2.8 was checked. Corrective Action Request is closed.
Corrective Action Request 10 (CAR10): Methodology that was used for monitoring is not provided.	Table 2, question D.1.1	Reflected in PDD ver.2.8. JI spesific approuch was used for monitoring.	PDD version 2.8 was checked. Corrective Action Request is closed.
Corrective Action Request 11 (CAR11): Amount of electricity supplied by TPP to the grid in year (EL_y) can't be measured. It must be difference between amount of produced electricity and amount electricity consumed on auxiliaries (included electricity consumed from grid).	Table 2, question D.1.5	Will be explicitly detailed in the Monitoring Report, where the physical meters will be shown which are involved in measurement for calculation of ELy	PDD version 2.8 was checked. Corrective Action Request is closed.
Corrective Action Request 12 (CAR12): Description of the formulae used to estimate anthropogenic emissions by source of GHGs due the project is not provided.	Table 2, question E.1.1	Reference in the section E has been made to formulae in section D which contains detailed descriptions of all formulae used for calculation of project emissions, emissions in the baseline and resulting emissions reduction.	PDD version 2.8 and supporting document were checked. Corrective Action Request is closed.

Draft report clarifications and corrective action requests by determination team	Ref. to checklist question in tables 2, 3 and 4	Summary of project owner response	Determination team conclusion
		All calculations are made in form of MS Excel sheets as a supporting document	
Corrective Action Request 13 (CAR13): Description of calculation of GHG project emissions in accordance with the formula specified in for the applicable project category is not provided.	Table 2, question E.1.2	The calculations are made using formulae 1 and 2 as described in section D.1.1.2 of the PDD ver. 2.8.	PDD version 2.8 and supporting document were checked. Corrective Action Request is closed.
Corrective Action Request 14 (CAR14): Description of formulae used to estimate the anthropogenic emissions by source of GHGs in the baseline using the baseline methodology for the applicable project category is not provided.	Table 2, question E.4.1	The calculation is made using formulae 3 and 4 as described in D.1.1.4. Conservative assumptions: not taking into account the natural deterioration of plant efficiency, fixing the baseline efficiency using extended period of seven years have been used as described in section B.1. See PDD ver. 2.8.	PDD version 2.8 and supporting document were checked. Corrective Action Request is closed.
Corrective Action Request 15 (CAR15): Description of calculation of GHG baseline emissions in accordance with the formula specified in for the applicable project category is not provided.	Table 2, question E.4.2	The calculation is made using formulae 3 and 4 as described in D.1.1.4. Conservative assumptions: not taking into account the natural deterioration of plant efficiency, fixing the baseline efficiency using extended period of seven years have been used as described in section B.1. The calculation has been made using formula	PDD version 2.8 and supporting document were checked. Corrective Action Request is closed.

Draft report clarifications and corrective action requests by determination team	Ref. to checklist question in tables 2, 3 and 4	Summary of project owner response	Determination team conclusion
		5 as described in section D.1.4.	
Corrective Action Request 16 (CAR16): Transboundary effects are not considered (no effect can be deduced only). Please, specify if the project has no transboundary impact. If no, clarify why it is not expected.	Table 2, question F.1.5	According to the design documentation, which includes the environmental impact assessment, there is no transboundary impact to be expected. All pollution has been occuring within the sanitary zone of the Zuyevska TPP.	PDD version 2.8 was checked. Corrective Action Request is closed.
Clarification Request 1 (CL1): Richard Smith provided comments by the proposed project activity dated 24th November 2009. Please provide response.	Table 1, question 10	Global Carbon provided response on the comments received by the Independent Entity dated 24th November 2009, from Richard Smith. See section 4 of the Determination Report above.	Response was provided (see table in section 4 above). Clarification Request is closed.
Clarification Request 2 (CL2): See section A.2 of the PDD. Please, explain in section A.2 of PDD how the proposed project activity reduces greenhouse gas emissions.	Table 2, question A.2.2	Explanation added to PDD ver.2.8 dated 15/12/2010, p.4 ... Implementation of the proposed project activity allows for producing power with higher efficiency, thus reducing the amount of combustion of fossil fuels (mainly coal) significantly below the level of what would happen in the absence of the proposed project. It directly results in reduction of GHG emission...	PDD version 2.8 was checked. Clarification Request is closed.

Draft report clarifications and corrective action requests by determination team	Ref. to checklist question in tables 2, 3 and 4	Summary of project owner response	Determination team conclusion
Clarification Request 3 (CL3): See section A.4.2 of the PDD. Please, clarify in PDD if the project design engineering reflect current good practices	Table 2, question A.4.2.1	Clarified in PDD ver.2.8 dated 15/12/2010, p.4. The design solutions proposed for project implementation reflect the good engineering practices provided by major local and international equipment manufacturers.	PDD version 2.8 was checked. Clarification Request is closed.
Clarification Request 4 (CL4): See section A.4.2 of the PDD. Please, clarify in PDD if the project use state of the art technology or would the technology result in a significantly better performance than any commonly used technologies in the host country.	Table 2, question A.4.2.2	Clarified in PDD ver.2.8 dated 15/12/2010, p5... represent state of the art modernisation technology which could be applied over the existing power plant equipment...	PDD version 2.8 was checked. Clarification Request is closed.
Clarification Request 5 (CL5): Please, clarify in PDD if the project technology is likely to be substituted by other or more efficient technologies within the project period.	Table 2, question A.4.2.3	Clarified in PDD ver.2.8 dated 15/12/2010, p.5 ... This will allow operation of TPP units with high efficiency for the long period without a need to replace or substitute the equipment by more efficient one within the project period...	PDD version 2.8 was checked. Clarification Request is closed.
Clarification Request 6 (CL6): Please, clarify in PDD if the project requires extensive initial training and maintenance efforts in order to work as presumed during the project period.	Table 2, question A.4.2.4	Clarified in PDD ver.2.8 dated 15/12/2010, p.5... Since the main process of electricity production stays the same, it is not expected that operation and maintenance of equipment will represent difficulties for plant personnel...	PDD version 2.8 was checked. Clarification Request is closed.
Clarification Request 7 (CL7): Please, clarify in PDD if the project makes	Table 2,	Clarified in PDD ver.2.8 dated 15/12/2010, p.5 ... Some new equipment, like control and	PDD version 2.8 was checked. Clarification Request is closed.

Draft report clarifications and corrective action requests by determination team	Ref. to checklist question in tables 2, 3 and 4	Summary of project owner response	Determination team conclusion
provisions for meeting training and maintenance needs	question A.4.2.5	instrumentation, however would require initial training of staff. This will be provided by the respective suppliers...	
Clarification Request 8 (CL8): Please, clarify if was used methodology AM0061, or else and specify version of methodology.	Table 2, question B.1.1	Clarified in PDD ver.2.8 dated 15/12/2010. A JI specific approach regarding baseline setting and monitoring has been developed in accordance with Appendix B of the JI Guidelines and with the JISC Guidance. This specific approach will use some elements of CDM methodology AM0061 as stated in section B.1.	PDD version 2.8 was checked. Clarification Request is closed.
Clarification Request 9 (CL9): Please, clarify the basic assumptions of the baseline methodology in the context of the project activity presented (See Annex 2)	Table 2, question B.1.4	Clarified in PDD ver.2.8 dated 15/12/2010. The basic assumptions of the baseline methodology are: - Production of electricity in the baseline would stay the same as in the project case; - The plant efficiency in the baseline stays the same as if it would be no modernisation; - The baseline efficiency has been fixed ex-ante on the basis of average annual plant efficiencies for seven most recent years preceding the start of project activity; - The natural deterioration of plant efficiency is not taken into account for	PDD version 2.8 was checked. Clarification Request is closed.

Draft report clarifications and corrective action requests by determination team	Ref. to checklist question in tables 2, 3 and 4	Summary of project owner response	Determination team conclusion
		conservativeness.	
Clarification Request 10 (CL10): **Step 1 Identification of alternatives.** Please note that Additionality Tool ver. 05.2 foresees division of step 1 into two substeps (1a and 1b). Please rework the paragraph accordingly. Your aim in this step is to prove that all/several alternatives are not prevented from implementation by laws and mandatory regulations. So please indicate that all identified alternatives (1-6) are consistent with law of Ukraine and mandatory regulations in force. Please note that the statement that alternative 6 is the only feasible and credible alternative is rather confusing, I would suggest eliminating it.	Table 2, question B.2.1	Section B.1 has been reworked in PDD ver.2.8 dated 15/12/2010.	PDD version 2.8 was checked. Clarification Request is closed.
Clarification Request 11 (CL11): **Step 2 investment analysis.** Please note that the first sentence of the second paragraph of substep 2a is incorrect. There is no obstacles for using option II, so it is better to erase this sentence at all.	Table 2, question B.2.1	Investment analysis is corrected in response to draft DR and comments. Corrected in PDD ver. 2.8	PDD version 2.8 was checked. Clarification Request is closed.
Clarification Request 12 (CL12):	Table 2,	Corrected in PDD ver. 2.8	PDD version 2.8 was checked.

Draft report clarifications and corrective action requests by determination team	Ref. to checklist question in tables 2, 3 and 4	Summary of project owner response	Determination team conclusion
Benchmark analysis is the proper method for the present project. Using external benchmark is sufficiently justified by the developer. Please note that approach (a) is used, not 4c as indicated in the text.	question B.2.1		Clarification Request is closed.
Clarification Request 13 (CL13): I would also recommend moving calculation of the benchmark to the sub-step 2B in order the reader could easily see the actual value of the benchmark (IRR derived from the benchmark rate).	Table 2, question B.2.1	Calculations are kept in supporting document 20101215_SD02_CF_ver2.7 in order to keep the section more readable	PDD version 2.8 was checked. Clarification Request is closed.
Clarification Request 14 (CL14): Please note that exchange rates used in the financial model and the text are outdated. Please use the current EUR/UAH exchange rates. The same applies to the prices for coal, natural gas and mazut. The prices indicated in the document now are very far from reality and shall be updated.	Table 2, question B.2.1	All calculations made in UAH only (same as all indicators are based on UAH indexes) version of SD: 20101215_SD02_CF_ver2.7	20101215_SD02_CF_ver2.7 was checked. Clarification Request is closed.
Clarification Request 15 (CL15): If you choose to make all calculations in UAH in order to be consistent with the benchmark please eliminate the conversion of the capital	Table 2, question B.2.1	Corrected in PDD ver.2.8 and SD 20101215_SD02_CF_ver2.7	PDD ver.2.8 and 20101215_SD02_CF_ver2.7 were checked. Clarification Request is closed.

Draft report clarifications and corrective action requests by determination team	Ref. to checklist question in tables 2, 3 and 4	Summary of project owner response	Determination team conclusion
costs for reconstruction in the sub-step 2c from UAH to EUR as unnecessary. Indication of the exchange rate applied for project calculations in the first paragraph of sub-step 2c will be sufficient instead.			
Clarification Request 16 (CL16): Please note that actually cash flow calculations are made for the period of 2007-2019 (13 years). Please correct the relevant sentence in sub-step 2c accordingly. In general this period of calculations is well justified by the expected residual lifetime of machinery and equipment.	Table 2, question B.2.1	Corrected in PDD ver.2.8.	PDD version 2.8 was checked. Clarification Request is closed.
Clarification Request 17 (CL17): Please note that the Guidance article 4 requires the fair value of the project assets at the end of the end of assessment period to be included in the cash flow for the final year. The use of the book value or potential selling price (scrap value) may be used for this purpose.	Table 2, question B.2.1	Corrected in PDD ver.2.8 and SD 20101215_SD02_CF_ver2.7	PDD version 2.7 and SD 20101215_SD02_CF_ver2.7 were checked. Clarification Request is closed.
Clarification Request 18 (CL18): Slight discrepancy exists between baseline	Table 2, question B.2.1	Baseline consumption corrected in SD 20101215_SD02_CF_ver2.7 and PDD ver.2.8. The discrepancy occurred due to	PDD version 2.8 was checked. Clarification Request is closed.

Draft report clarifications and corrective action requests by determination team	Ref. to checklist question in tables 2, 3 and 4	Summary of project owner response	Determination team conclusion
coal consumption indicated in 20091028 SD02.xls and 20091009_SD01_ER_ver2.0.xls excel spreadsheets. Please correct whichever is wrong.		rounding of heat value of ton of coal equivalent (t.c.e.) expressed in MJ.	
Clarification Request 19 (CL19): Please provide in section B.2 of the PDD description of the project scenario.	Table 2, question B.2.3	Corrected in PDD ver.2.8, p. 22 ...The proposed project activity would constitute in reconstruction/modernization of main and auxiliary equipment of all four units of the TPP.	PDD version 2.8 was checked. Clarification Request is closed.
Clarification Request 20 (CL20): See section B.2 of the PDD. Please provide relevant state norms on power tariffs regulation. See section B.1 (3.3. Other barriers)	Table 2, question B.2.6	Amendments has been made in PDD ver.2.8 and referring to state norms on power tariffs regulation is no more used.	PDD version 2.8 was checked. Clarification Request is closed.
Clarification Request 21 (CL21): Please clarify in PDD why the date 30 December 2008 was accepted as the project's starting date clearly defined?	Table 2, question C.1.1	Clarified in PDD ver.2.8. The project starting date of 21 December 2004. 21 Dec 2004 Feasibility study was ordered, FS completed by the end of 2005 and the start of first unit reconstruction occurred 30 Dec 2008.	PDD version 2.8 was checked. Clarification Request is closed.

Draft report clarifications and corrective action requests by determination team	Ref. to checklist question in tables 2, 3 and 4	Summary of project owner response	Determination team conclusion
Clarification Request 22 (CL22): If Approach is own, please provide sources that was used for it development.	Table 2, question D.1.1	Clarified in PDD ver.2.8. A JI Specific baseline and monitoring approach has been chosen, using selected elements of approved CDM methodology AM0061. Additionality has been demonstrated using he most recent "Tool for the demonstration and assessment of additionality" version 05.2.	PDD version 2.8 was checked. Clarification Request is closed.
Clarification Request 23 (CL23): Carbon Emission Factor in PDD and SD1 (version 2.0) is indicated different. Please, clarify it.	Table 2, question D.1.2	Clarified in PDD ver.2.8 and SD1. Difference occurred due rounding of CEF of natural gas.	PDD version 2.8 and SD1 were checked. Clarification Request is closed.
Clarification Request 24 (CL24): Please, clarify in PDD why thermal energy produced by TPP is not used in calculations.	Table 2, question D.1.2	Clarified in PDD ver.2.8. Thermal energy produced by the project activity power plant is used only for heating the premises of the TPP and dwellings of plant personnel in an adjacent village. The amount of thermal energy is not influenced by the project (stays the same in both baseline and project cases.	PDD version 2.8 was checked. Clarification Request is closed.
Clarification Request 25 (CL25): Please, clarify why oxidation factor of the fuel was not used in calculations?	Table 2, question D.1.4	Project does not foresee the changes in types of fuel used. Fuel mix (coal, mazut, gas) is equal in both BL and Project scenarios. Applying of oxidation factor will have no influence on the emission reduction	Clarification Request is closed.
Clarification Request 26 (CL26):	Table 2,	Fixed specific fuel consumption approach is used in many existing CDM methodologies	PDD version 2.8 was checked. Clarification Request is closed.

Draft report clarifications and corrective action requests by determination team	Ref. to checklist question in tables 2, 3 and 4	Summary of project owner response	Determination team conclusion
Annual specific fuel consumption changed in 2002-2004 (see Table 4: "Calculation of baseline specific fuel consumption" of the PDD) without JI project activity. Please justify using of fixed specific fuel consumption.	question D.1.6	(e.g. AM0061 where it is used as efficiency of power plant prior to the implementation of the project). For conservativeness reason the base for setting of SFC_{BSL} is extended from three to seven years in PDD ver. 2.8	
Clarification Request 27 (CL27): Please justify that the leakage is not expected.	Table 2, question D.1.10	Clarified in PDD ver.2.8. There are fugitive CH4 emissions associated with fuel extraction, processing, transportation. The proposed project does not foresee the change of fuels type. The amount of fuels used in project scenario is lower than that in the baseline, therefore, the fugitive emissions associated with fuels extraction and handling are lower as well. The emissions reduction due to it is not clamed, which is conservative.	PDD version 2.8 was checked. Clarification Request is closed.
Clarification Request 28 (CL28): Please, clarify in PDD why this item is not applicable.	Table 2, question D.1.13	Clarified in PDD ver.2.8. The environmental impact assessment has been performed which contains information on the collection and archiving of information on the environmental impacts.	PDD version 2.8 was checked. Clarification Request is closed.
Clarification Request 29 (CL29): Please, provide reference to the relevant host Party regulation(s)	Table 2, question D.1.14	Clarified in PDD ver.2.8 p. 47	PDD version 2.8 was checked. Clarification Request is closed.
Clarification Request 30 (CL30):	Table 2,	Name of the person has been changed to	PDD version 2.8 was checked.

Draft report clarifications and corrective action requests by determination team	Ref. to checklist question in tables 2, 3 and 4	Summary of project owner response	Determination team conclusion
Name of person/entity determining the monitoring plan: Global Carbon B.V. Alexey Doumik Please, provide Alexey Doumik contact information.	question D.4.1	Lennard de Klerk, contact information provided in PDD ver. 2.8	Clarification Request is closed.
Clarification Request 31 (CL31): Please clarify if conservative assumptions are used to calculate project GHG emissions	Table 2, question E.1.3	Conservative assumptions were used to calculate project GHG emissions.	PDD version 2.8 was checked. Clarification Request is closed.
Clarification Request 32 (CL32): Please clarify in section E.4 of PDD if conservative assumptions are used to calculate baseline GHG emissions	Table 2, question E.4.3	Conservative assumptions are used in calculating the baseline factors. See p. 41 of the PDD ver.2.8.	PDD version 2.8 was checked. Clarification Request is closed.
Clarification Request 33 (CL33): Please, clarify if are any requirements for an Environmental Impact Assessment (EIA)?	Table 2, question F.1.2	Clarified in PDD ver.2.8. According to the Ukrainian legislation, the performance of EIA is obligatory. The EIA has been performed for the units #2 and #1 which first to undergo reconstruction. For the next two units the EIA will be performed approximately one year prior to the reconstruction start as described in section F of PDD ver.2.8	PDD version 2.8 was checked. Clarification Request is closed.
Clarification Request 34 (CL34):	Table 3,	Clarified in PDD ver.2.8. The proposed	PDD version 2.8 was checked.

Draft report clarifications and corrective action requests by determination team	Ref. to checklist question in tables 2, 3 and 4	Summary of project owner response	Determination team conclusion
Please, clarify how uncertainties were taken into account.	question 1.1.6	approach allows reducing the uncertainties by using of historically recorded data for the extended period of seven years preceding the project start as well as parameters measured in the project scenario for the baseline. The usage of values measured with high accuracy (electricity and fuel) and IPCC default factors is foreseen.	Clarification Request is closed.
Clarification Request 35 (CL35): Proposed project activity is not capital construction. Please clarify in PDD is the project activity environmentally licensed by the competent authority	Table 4, question 1.1	Clarified in PDD version 2.8 Section F. The assessment of environmental impact (AEI) for the project activity was performed for two units: #2 and #1 which are the first units under the project schedule. Approximately a year in advance of start of reconstruction of units 3 and 4 the AEI will be performed for these units as well. The conclusions drawn from the assessment are positive and confirm that the project activity is in line with Ukrainian environmental legislation in force. Section F.2 provides the data on AEI performed and legislation in force.	PDD version 2.8 was checked. Clarification Request is closed.
Clarification Request 36 (CL36): Please clarify in PDD if conditions of the environmental permit?	Table 4, question 1.2	Positive assessment conclusion as described in PDD ver.2.8 section F.2.	PDD version 2.8 was checked. Clarification Request is closed.

APPENDIX B: VERIFIERS CV'S

Ivan G. Sokolov, Dr. Sci. (biology, microbiology)

Internal Technical Reviewer, Climate Change Lead Verifier, Bureau Veritas Certification Holding SAS Local Climate Change Product Manager for Ukraine

Bureau Veritas Certification Holding SAS Operational Manager

He has over 25 years of experience in Research Institute in the field of biochemistry, biotechnology, and microbiology. He is a Lead auditor of Bureau Veritas Certification for Environment Management System (IRCA registered), Quality Management System (IRCA registered), Occupational Health and Safety Management System, and Food Safety Management System. He performed over 140 audits since 1999. Also he is Lead Tutor of the IRCA registered ISO 14000 EMS Lead Auditor Training Course, and Lead Tutor of the IRCA registered ISO 9000 QMS Lead Auditor Training Course. He is Lead Tutor of the Clean Development Mechanism /Joint Implementation Lead Verifier Training Cours and he was involved in the determination/verification over 50 JI/CDM projects.

Kateryna Zinevych, M. Sci. (environmental science)

Climate Change Verifier

Bureau Veritas Ukraine Health, Safety and Environmental Project Manager

Kateryna Zinevych has graduated from National University of Kyiv-Mohyla Academy with the Master Degree in Environmental Science. She has successfully completed IRCA registered Lead Auditor Training Course for Environment Management Systems and Quality Management Systems. She has undergone a training course on Clean Development Mechanism /Joint Implementation and she is involved in the determination/verification of 26 JI projects.

Oleg Skoblyk, Specialist (Power Management)

Climate Change Verifier

Bureau Veritas Ukraine HSE Department project manager.

Oleg Skoblyk has graduated from National Technical University of Ukraine 'Kyiv Polytechnic University" with specialty Power Management. He has successfully completed IRCA registered Lead Auditor Training Course for Environment Management Systems and Quality Management Systems. Oleg Skoblyk has undergone intensive training on Clean Development Mechanism /Joint Implementation and he is involved in the determination/verification of 9 JI projects.

Denis Pishchalov, Financial Specialist

Bureau Veritas Specialist in economics

Master of foreign trade, he has more than five year of experience in foreign trade and procurement. In particular one year as foreign trade manager in the Engineering Corporation

(manufacturer and contractor in the municipal sector) and one year in the NIKO publishing house, one year as sales manager in the ITALCOM srl. In addition Denis has spent four years working as procurement specialist in Ukrainian Energy Service Company and two years as chief product manager in the Altset JSC. At the moment Denis is deputy director for finance and economy in the SUD of UTEM JSC.

Report was reviewed by:

Mr. Leonid Yaskin, PhD (thermal engineering)

Internal Technical Reviewer.

Bureau Veritas Certification Rus General Director, Climate Change Local Manager, Lead Auditor, IRCA Lead Tutor, Climate change Lead Verifier,

He has over 30 years of experience in heat and power R&D, engineering, and management, environmental science and investment analysis of projects. He worked in Krrzhizhanovsky Power Engineering Institute, All-Russian Teploelectroproject Institute, JSC Energoperspectiva. He worked for 8 years on behalf of European Commission as a monitor of Technical Assistance Projects. He is a Lead auditor of Bureau Veritas Certification for Quality Management Systems (IRCA registered), Environmental Management System (IRCA registered), Occupational Health and Safety Management System (IRCA registered). He performed over 250 audits since 2002. Also he is a Lead Tutor of the IRCA registered ISO 14000 EMS Lead Auditor Training Course, and a Lead Tutor of the IRCA registered OHSAS 18001 Lead Auditor Training Course. He is an Assuror of Social Reports. He has undergone intensive training on Clean Development Mechanism /Joint Implementation and was/is involved in the determination of over 50 JI projects.